AN EMPIRICAL ANALYSIS OF BANK PERFORMANCE AND REGULATORY REQUIREMENTS IN SOUTH AFRICA

by

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ABSTRACT

This study examined the nexus between bank performance and regulatory requirements in South Africa. The panel regression approach was used, which applied panel data from 12 banks that were registered in terms of the Bank Act 94 of 1990 over the period 2009 to 2019. A quantitative research approach was used to investigate the nexus between bank performance, bank regulations, bank-specific factors and some macroeconomic factors. A regression analysis was conducted on four bank performance ratios using pooled ordinary least square regression, fixed effects, random effects and generalised methods moments. The two-step generalised system methods of moments approach was preferred over the other methods because it eliminated the problem of endogeneity. The results showed that capital adequacy and size have both a positive and negative significant effect on bank performance, while interest rates, non-performing loans, liquidity coverage ratios and net stable funding ratios had a negative and significant effect on bank performance.

The study concluded that South African banks could enhance their performance by tightening their credit risk assessment framework to be more prudent in their lending practices in order to improve the lending quality of their loan books. It is recommended that banks keep their capital levels at a minimum to avoid excessive risk-taking, and that they by embark on efficient revenue enhancement activities such as increasing retained earnings. Banks must further look at their clients on an overall basis, not just a transactional basis, as this will improve their non-interest revenue income by introducing innovative products. Lastly, the banks must lower their liquidity risk exposure by collectively managing their capital adequacy ratio, size of the bank, interest rates, non-performing loans, liquidity coverage ratio and net stable funding ratio. The South African Reserve Bank should tighten regulatory requirements by improving its supervision and oversight functions; banks must to adhere to lending practices and foster a healthy and adequately capitalised balance sheet. Lastly, the SARB must align its macroeconomic forecast for lending rates with regulatory requirements to ensure that economic performance is a catalyst for bank performance.

This study contributes to the empirical research repository on the nexus of bank performance and regulatory requirements. More importantly, it identifies the significant factors that affect South African bank performance, by identifying the deficiencies in South Africa's regulatory requirements, which will provide the South African Reserve Bank with insight into ways of enhancing its regulatory requirements to improve the performance, management practices and sound capital adequacy of the banking sector.

Keywords: bank regulation, bank performance, capital regulation, capital adequacy, global financial crisis, interest rates.

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DEDICATION

I dedicate this dissertation to five people who are so precious to me:

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DECLARATION

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AN EMPIRICAL ANALYSIS OF BANK PERFORMANCE AND REGULATORY REQUIREMENTS IN SOUTH AFRICA

I declare that the above dissertation is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references. I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

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SIGNATURE DATE

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LIST OF ABBREVIATIONS

AE: African Economies

ALM: Aggregate linear Mismatch Index

BCBS: Basel Committee on Banks Supervision

BIS: Bank of International Settlements

BLMI: Bank Liquidity Mismatch Index

CAR: Capital Adequacy Ratio

CEO: Chief Executive Officer

EM: Equity Multiplier

FDIC: Federal Deposit Insurance Corporation

FOS: Financial Organisation Examiner

FSB: Financial Service Board

GDPG: Gross Domestic Product Growth Rate

GDP: Gross Domestic Product

GMM: Generalised Methods of Moments

HHI: Herfindahl-Hirschman Index

H-PR: Herfindahl Panzar and Rose

INT: Interest Rates

LCR: Liquidity Coverage Ratio

MOU: Memorandum of Understanding

NIM: Net Interest Margins

NPL: Non-Performing Loans

NSFR: Nestable Funding Ratio

PSRM: Principles for Sound Liquidity Risk Management

ROA: Return on Assets

RMP: Relative Market Power

ROE: Return on Equities

SARB: South African Reserve Bank

SCP: Structure Conduct Performance

SSA: Sub-Saharan Africa

SEE: South Eastern Europe

SEM: Stock Exchange Market

UFIRS: Uniform Financial Institution Rating Systems

UMPL: Unemployment

UNISA: University of South Africa

USA: United States of America

CHAPTER 1

1.1 INTRODUCTION AND BACKGROUND

Over the past two decades, a number of financial crises have taken place that have increased regulators' concerns regarding the stability of the financial sector (Majumder & Li, 2017). In recent years, the banking sector globally has been the subject of intense criticism and scrutiny, in part because many believe that a lack of regulations and supervisory structures have brought about these crises. Meanwhile, some scholars argue that the financial crisis was a result of deregulation or lack of regulation (Alam, 2013).

The 2007-2009 financial crisis created great turmoil regarding the stability of the banking sector and the effectiveness of banking regulations (Hogan, Meredith & Pan, 2015). Economists, academics and scholars have different opinions about the causes of the financial crisis (Archarya & Richardson, 2009; Crotty, 2009), which demonstrates the need to rethink the role of capital requirements in economic models since the traditional models have proven to be inadequate (Marozva, 2017). Peni and Vahamaa (2012) proposed different solutions, including increasing bank capital requirements and improving transparency in the banking sector. According to Lo (2009), the blame for the financial crisis refers to the risk-based capital, which is regulations based on the Basel Accord. Risk-based capital has been linked to the build-up of risk in the banking sector in the United States of America (USA), Europe and African countries including South Africa (Nyoka, 2017; Dowd, Hutchinson, Hinchliffe & Ashby, 2011). This risk-based capital has led to the introduction of a global charter that regulates banks' capital requirements, namely the Basel III accord.

The Basel III Accord aims to make each bank hold capital that is proportional to its credit losses (Osei-Assibey & Asenso, 2015). The classical financial market theories such as capital adequacy requirements were introduced to address capital holding regulatory issues. The holding of proportional capital was then referred to as capital adequacy, and this was suggested by the Basel Committee on Banking Supervision (BCBS, 2006). Their reasoning for introducing capital adequacy was that capital has long been categorised as a critical factor when the safety and soundness of a particular bank are assessed.

Capital adequacy aims to absorb possible losses, provide a basis for maintaining depositors' confidence in banks, and serves as the buffer and risk-taking activities (Greuning & Bratanovic, 2000). Again, the capital adequacy requirements serve as a buffer against risk-taking in terms of lending, which is demanding for all economies, especially fragile developing ones because they are vulnerable to sharp cyclical fluctuations in financing (Griffith-Jones & Persaud, 2008). The justification for this is that it is very challenging and costly to raise equity in developing countries; for example, in African countries, the cost of holding capital mostly comes from loan prices. While capital regulations are undoubtedly necessary, high capital adequacy regulations can also become a disincentive to credit expansion, particularly for perceived high-risk customers, which are the bedrock of most African Economies (AE). Posner (2015) believed that capital adequacy will make the financial system to be more stable and reduce future occurrences of financial crises, when banks are holding more and better-quality capital, as well as more robust liquidity buffers. Marozva (2015) believed that the traditional measures of capital are basic and inadequate, and do not provide relevant information about the banking sector and its linkage to the real economy. The analysis of bank performance and regulatory requirements will provide relevant information between the banking sector and the real sector economy.

The most significant recent reform in international banking regulations was in the area of capital adequacy. After the reform, questions were raised by regulators as to why capital adequacy was adopted as a tool for global banking regulation (Zheng, Xu & Liang, 2012). A response by researchers was that many banks had failed during the financial crisis of 2007-2009. These failures were attributed to poor governance practices that were unable to manage capital adequacy and liquidity management (Abou-El-Sood, 2017). Banks are key component of the financial sector in any economy, and they perform valuable activities on both sections of the balance sheet (Arif & Anees, 2012:181). On the asset section, they enhance the flow of funds by lending to cash-starved users, whereas they provide liquidity to savers on the liabilities side (Diamond & Rajan, 2001). According to Luvuno (2018), banks must maintain sufficient liquidity to bring stability to the financial sector, as this will provide confidence in the public sector.

For economic development to take place, the onus is on the banking sector to provide sound and sufficient liquidity buffers (Mashamba, 2018). Diamond and Rajan (2001) argued that liquidity alone is not adequate to measure bank performance; the size of the bank is also a contributing factor. According to Arawati and Maksum (2018), Taranhike (2017), Bukair and Rahman (2015), Mashonganyika (2015), Dawar (2014) and Jara-Bertin (2014), larger banks usually face financial distress, which is caused by common factors such as excessive risk-taking, by not focusing enough on profitability, and liquidity management. It is for this reason that banks are encouraged to hold liquidity buffers of liquid assets to be able to enhance their performance (Marozva, 2015; 2017). Therefore, the analysis of regulatory drivers of bank performance, such as capital adequacy and liquidity requirements, are discussed in this study.

Scholars such as Okoye, Ikechuku, Leonard, Chinyere and Christioan (2017), Majumder and Li (2017), Soile-Bologum (2017), Charmier, Musah, Akomeah and Gakpetor (2018) and Aktas, Acikalin, Bakin and Celik (2015) have contributed to the literature on bank performance, regulatory requirements and liquidity requirements, and applied different measurements of bank performance in their studies. Soile-Bologum (2017) and Okoye *et al.* (2017) conducted empirical studies on bank performance, regulatory requirements and liquidity, and identified the following factors – return on assets, net interest margin, return on capital employment, capital asset ratio, liquidity ratio and loan on loss. Charmier *et al.* (2018) and Aktas *et al.,* (2015) used different variables, for example, size of the bank, performance, liquidity, net interest margin, risk and capital adequacy ratio. Alam (2013) examined whether bank regulatory requirements, legislation, supervision, liquidity, and monitoring enhance technical efficiency and risk-taking behaviour across the globe, while Buallay, Hamdan, Reyed, Badawi and Madbouly (2019) investigated the relationship between intellectual capital efficiency and financial performance. Buallay *et al.* (2019) recommended that banks pay more attention to capital requirements to avoid a financial crisis and report excellent performance on financial statements. Hutchinson and Xavier (2006) indicated that there is a negative relationship between regulatory requirements and bank performance.

However, the results of all research to date are not conclusive. When this is added to the fact that there is no evidence of research to date that focuses on an emerging economy, one can see the need for this study to fill the gap in the literature. Sulieman and Alshatti (2014) investigated the relationship between liquidity management and bank performance in Pakistani banks. Their results revealed that having enough liquidity does not guarantee great performance of the bank. Their findings were inconsistent with those of Arif and Anees (2012), who concluded that banks, in general, manage liquidity risk by having sufficient cash resources on hand, as this will reduce any liquidity gap by minimising dependence on the repo market.

Global evidence has shown that the deregulation of the banking sector was affected by the financial crisis, which contributed to the financial instability of each country (Moyo, Nandwa, Oduor & Simpasa, 2014). In sub-Saharan Africa (SSA), the financial system is weak and unstable. This is mainly due to systemic bank failures and non-compliance with banking regulations, which has negatively affected each country's economy (Moyo *et al*., 2014). In African countries, the banking sector's development was generally considered suitable for the economy because it encourages financial innovation and promotes a financial system that leads to higher economic growth (Nyoka, 2017).

Banks need to practice prudent risk management and follow regulations in order to protect the interests of investors. Existing empirical research studies have shown that a regulatory framework plays an essential role in maintaining performance of the banking institutions (De Andres & Vallelado, 2008; Beasley, 1996), while a lack of regulatory framework causes significant financial losses. These losses negatively affect the bank performance, for example, not complying with the capital regulatory requirements result to poor bank performance (Constantos, 2015; SARB, 2014).

The South African banking system has also suffered as a result of bank failures. The reduced application of bank regulatory requirements and liquidity management was identified as being among the reasons for bank failures (Marozva, 2015).

The following South African banks have failed since 1990: Alpha Bank Limited, Cape Investment Bank Limited, Pretoria Bank, Saambou Bank and African Bank (Tjiane, 2015).

The failure of banks remains a challenge within the banking industry as it gives rise to systemic risk (Heffernan, 2010). Successful banks implement prompt corrective action and apply an integrated approach to address bank regulations and liquidity management while improving supervision and performance. There is a growing trend of research on capital regulations for bank stability and soundness (Osei-Assibey & Asenso, 2015). This regulation has been restored by the introduction of a global charter that regulates banks' capital requirements following the Basel III accord. Alternatively, this can be done by reserving a certain percentage from the capital, called the capital adequacy ratio (Nyoka, 2017:73). Nyoka (2017) and Hull (2015) elaborated further on Basel, explaining that it requires banks to maintain a total asset equal of 8% as the risk-weighted assets that encompass credit, market and operational risk.

This Basel Accord III requirement aims to make individual banks hold proportional capital to their potential credit losses (Boora & Jongra, 2019). This is because capital has long been identified as one of the critical factors to be considered for capital adequacy requirements, and when the safety and soundness of a particular bank are being assessed (Tjiane, 2015). In mid-2008, the BCBS issued a liquidity requirement framework called Principles for Sound Liquidity Risk Management and Supervision (PSLRM), which were published by the Bank for International Settlements (BIS, 2008). The purpose of this principle aspect of regulation is to guide the liquidity risk framework and funding liquidity aspect (Luvuno, 2018). Again, the policy aspect of complying with bank regulations and the liquidity risk framework determines how long a bank remains in business from a regulatory point of view. According to the BIS (2015), the Basel III framework, which is part of the liquidity framework, highlights the importance of liquidity risk management. This includes two minimum standards for liquidity funding risk, the first of which is the Liquidity Coverage Ratio (LCR).

The objective of LCR is to ensure that banks have a robust short-term liquidity profile by guaranteeing that they have sufficient high-quality liquid assets coverage to cover a significant stress scenario for at least 30 days. Since 2015, banks have been required to hold assets against anticipated net liquid outflows for 30 days (BIS, 2014).

Liquid assets primarily constitute cash, short term interbank lending, reserves with the central bank, marketable securities and any form of lending to the central bank within 30 days of stress period (Marozva, 2017). The second standard is the Net Stable Funding ratio (NSFR). The objective of NSFR is to ensure that banks have a resilient longer-term structural profile by creating additional incentives for banks to fund their activities with more stable sources of funding on an ongoing basis (BIS, 2015). According to Marozva (2017), the availability of the stable funding required of a particular bank is likely to be driven by its liquidity characteristics and remaining maturities of the different assets it holds, including off-balance sheets assets.

The BCBS and the Financial Services Board (FSB) issued supervisory standards and regulatory requirements (SARB, 2011) which make it compulsory for the SARB to conduct a continuous assessment on the supervisory departments, national regulatory, and supervisory framework to ensure that the SARB complies with international standards (Nyoka, 2017). The SARB concluded that the implementation of the LCR and NSFR as part of Basel III would be effective as of January 2015 (SARB, 2011). The SARB ensured that all locally registered banks in South Africa in terms of Act 94 of 1990 would implement the LCR and NSFR framework through regulations, and was issued in 2012 (SARB, 2016).

The South African banking sector was affected by the global financial crisis, given that it forms part of the worldwide economy (Kumbirai & Web, 2010). In response to these, financial crisis the SARB introduced a new liquidity framework as part of Basel III published by the BCBS, which has impacted all locally registered South African banks because they are now obligated to hold a certain percentage of capital and liquidity (SARB, 2016).

Taking into account how immediate liquidity in the banking sector affects bank performance, this study aimed to analyse bank performance and regulatory requirements in South African banks.

1.2 The goals and objectives of the bank regulatory requirements

Bank regulatory requirements aim to mitigate excessive risk-taking by individual banks, as well as to regulate capital levels to safeguard depositors' confidence in the event of a financial crisis (Taranhike, 2017; Lee & Lu, 2015; Nanda & Nicholas (2014).The regulations are put in place by public authorities, do not have a contractual relationship with banks. Regulatory requirements are aimed at influencing the risk-taking and the overall performance of the banking sector (Ncube, 2009). An objective of the banking regulations are to mitigate risk-taking by banks and regulate the capital adequacy level that banks should keep, safeguarding depositors' money in the event of a financial crisis (Dhouibi, 2016). Another aim is to keep the risk-taking of the bank as low as possible, in order to achieve excellent overall performance in the banking sector (Nimtrakoon, 2015; Luvuno, 2018).

Despite such efforts, banks are still underperforming, resulting in banking and financial crises worldwide. Barth, Lin, Ma, Seade and Song (2013) noted that there have been more than 100 systemic banking crises in the world since 1970. They argued that banking crises serve as indicators that there are deficiencies in the banking regulations worldwide. Klomp and De Haan (2011) stated that bank regulatory requirements and bank performance are an extensive area of study. As a result, the majority of studies have focused on the broader range of matters, although recently provided by the BCBS. Again, the majority of recent studies have looked at the effects of bank performance using the three pillars of Basel III's guidelines, and a full discussion is set out in Chapter 2. This study focused on bank performance and regulatory requirements in South Africa. The following review of extant research shows that there are some standard findings, but many remain inconclusive, hence the need for this study.

Andries and Capraru (2013) examined the relationship between competition and bank performance in 27 European countries from 2004 to 2010. The results revealed that competition has a significant favourable influence on bank performance in terms of profitability and cost-efficiency.

However, this result contradicts with that of Fungacova, Pessarossi and Weill (2013), who found no significant influence of bank regulations on bank performance for Chinese banks for the period 2002 to 2011. The findings of other studies on the subject of regulatory requirements and bank performance (Taranhike, 2017; Triki *et al.,* 2016; Ifeacho & Ngalawa, 2014; Andries & Capraru 2013; Klomp & De Haan, 2011; Keeley, 1990) were also inconclusive. Freixas and Santomero (2013) argued that it is the responsibility of the regulatory body to provide adequate firewalls so that a crisis does not spill over to other organisations in order to maintain banks performance. Klomp and Haan (2015) agreed with Freixas and Santomero (2013) that consistency in complying with strict regulations will sustain a bank and increase profitability, and also mentioned that the central bank is mandated to monitor and supervise the regulations of the banking sector.

The South African Reserve Bank (SARB) has the responsibility of imposing regulations on, and supervising, the banking sector in South Africa. In executing this mandate, the SARB is guided by the Banks Act 94 of 1990. According to section 74(2) of the Banks Act 94 of 1990, banks are required to report any failure or financial distress, together with the reasons for this failure, to the SARB (Shawe, Colegrave & Overy, 2017). The field of bank performance and regulatory requirements has been subject to theoretical and empirical research which are discussed in Chapters 2 and 3. The following sections summarise the broader studies on bank regulatory requirements and bank performance globally.

1.3 An overview of bank regulations in South Africa

The SARB is the central bank of South Africa and is responsible for banking regulations and requirements, the supervision of banks, and promoting the soundness of the domestic banking system through the effective and efficient application of supervision standards to minimise risk (Taranhike, 2017). For this reason, the BCBS requires appropriate banking regulations and supervision. In implementing such a mandate, the SARB is guided by specific Acts of parliament and legislation (Nyoka, 2017; Ifeacho & Ngalawa, 2014). The purpose of the legislation and supervision is to maintain an efficient banking system by protecting the depositors' interests and the economy of the country.

This function is achieved by issuing licences to banking institutions and by providing monitoring activities in terms of the Banks Act 94 of 1990. The Banks Act makes it mandatory for banks to comply with this Act; therefore, this study assessed if the banks that are registered in terms of the Act comply with the capital regulatory requirements or not, and if not, why and how this can be fixed. The Banks Act provides bank regulatory requirements and supervision of all banks that take deposits from the general public, except organisational institutions that are exempted from the provision of the Banks Act (Ifeacho & Ngalawa, 2014).

It is the primary responsibility of the Registrar and the SARB to ensure that all banks registered in terms of the Act comply with its requirements. One of the requirements is to comply with the minimum capital regulatory requirements (SARB, 2016). The purpose of this requirement is to create an absorption of any losses. If any of the risks to which banks may be exposed in conducting their business should materialise, this will provide a safeguard against the risk of insolvency. Banks are required to maintain a minimum capital adequacy ratio of 2.5% of its liabilities, the aim being to ensure that the banks can meet their obligations whenever required to do so and comply with the requirement (SARB, 2016). Capital adequacy is one of the requirements that banks must comply with, and falls under the CAMELS ratings.

The Uniform Financial Institutions Rating System (UFRIS) developed the CAMELS rating and is applied in the banking Sector (UFIRS, 1997). According to Desta (2016), who conducted a study on the performance of South African banks, CAMELS is the assessment of the financial performance system. Desta concluded that banks that are applying the CAMELS rating are rated as stable and satisfactory when measured in terms of CAMEL.

The CAMELS ratings were introduced in the 1980s by the international rating system for the examination of the banking system and is a standard criterion against which every bank's performance is measured (Gupta, 2014; Iloska, 2014). According to Suffian and Habibullah (2010), CAMELS involves the use of financial ratios to measure bank performance.

The purpose of CAMELS is to reflect the financial condition of a bank, its operational soundness and its regulatory compliance (Ong & Tech, 2013). The CAMELS rating was initially developed in the United States, and applies to every banking system worldwide, including South Africa (Gupta, 2016). The purpose of CAMELS is to prevent a bank run and provide management with a detailed report on bank performance, regulations, liquidity management, and risk-taking.

The Uniform Financial Institutions Rating System (UFRIS) developed the CAMELS rating and is applied in the banking Sector (UFIRS, 1997). According to Desta (2016), who conducted a study on the performance of South African banks, CAMELS is the assessment of the financial performance system. Desta concluded that banks that are applying the CAMELS rating are rated as stable and satisfactory when measured in terms of CAMEL. The components of CAMELS, as per Desta (2016), Ifeacho and Ngalawa (2014), Ongore and Kusa (2013), Sangmi and Nazir (2010), and (UFIRS, 1997) are Capital adequacy, Asset quality, Management efficiency, Earnings, Liquidity and Sensitivity.

Capital adequacy (C) refers to the amount of capital available to support a bank's operations and act as a buffer in case of an adverse situation or any shock. It is measured based on the capital adequacy ratio. Asset quality (A) refers to the quality of a bank’s loan book, which is a major asset that generates the majority of its income. It is usually measured as the non-performing loans ratio. Management efficiency (M) refers to the quality of a bank’s management in deploying its resources efficiently and captures, for example, total asset growth rate and earnings growth rate. Earnings (E) refers to how losses are absorbed; for example, a strong earnings profile of a bank reflects its ability to support present and future operations.

Liquidity (L) refers to a bank's ability to fulfil its obligations, mainly to depositors. Lastly, Sensitivity (S) reflects market risk. the degree to which changes in interest rates and repo rates can adversely affect banking organisations’ earnings or economic capital. The CAMELS rating is a uniform financial institution rating system, as well as useful internal supervisory tool for evaluating the soundness of a bank (Desta, 2016; UFIRS, 1997).

The bank regulatory body assigns each bank a score for various factors on a scale of one being the best and five being the worst. Should a bank have an average rating of two or less, it is considered to be a high-quality organisation, while those with a score that is greater than three are considered to be less satisfactory (UFIRS, 1997).

1.4 Bank performance and bank regulation

The field of bank regulation has been subjected to various studies since 1980 due to several factors. Among those factors was the attempt to harmonise bank regulations through the publication of the Basel guidelines to improve bank performance (Barth, Caprio & Levine, 2004). Regulations in the banking sector are of the highest interest to academics, scholars, economists and regulators due to their contribution to the performance of banks (Hassan, 2019). Banks that observe regulation requirements minimise moral hazards and excessive risk-taking, and thus improve performance. Barth (2013), Demirguc-Kant and Detragiache (2010) and Barth *et al.* (2004) investigated the relationship between bank regulations and bank performance, and the results showed a positive and significant relationship. They maintained that bank regulations force accurate information, empower the banking sector and promote bank performance and stability. To achieve a return on equities, banks can use a variety of techniques and strategies, capital regulation being one of them (Duasa, Zain & Al-Kayed, 2014). The relationship between capital adequacy and bank performance is of considerable importance in the banking sector. Banks are required to maintain a minimum capital ratio by regulatory bodies. Yet, they tend to substitute capital with debt to maximise their return on equity, which is in contradiction to Modigliani and Miller (1958) and results in poor performance.

The capital ratio is essential to banks because of the sensitivity to changes in financial leverage, which may lead to a low level of equity to total assets. However, Basel III heavily regulates capital regulation. In 2015, Basel III published two liquidity standards, namely the liquidity cover ratio (LCR) and the net stable funding ratio (NSFR) (Marozva, 2017). The relationship between liquidity standards and bank performance is subsequently discussed in this study, starting with the LCR.

The Basel IIII LCR encourages banks to maintain a diversified pool of high-quality liquid assets against short term assets – primarily net cash outflow. However, LCR appears noble from the theory perspective because it can reduce bank performance. After all, liquidity assets are considered to have low returns (Mashamba, 2018).

One of the main concerns raised about liquidity standards is that LCR does not guarantee the prevention of possible adverse effects on bank performance (Giordana & Shumacher, 2017). It has raised concerns amongst both scholars and academics that Basel III's liquidity resources are likely to reduce bank performance, as it compels banks to invest more in low yield return liquidity assets (Benerjee & Mio, 2017). Benerjee and Mio (2017) and Giordana and Schumacher (2017) investigated the relationship between LCR and bank performance. Their studies found a negative relationship, whereas Mashamba (2018) found no relationship between the two variables. The reason for the inconsistent results may be that the studies were conducted in different geographical areas, at different times and with various samples.

Basel III requires banks to preserve stable funding in the form of NSFR as related to the structure of their assets and off-balance sheet activities (BIS, 2014) in order to maintain excellent performance. Muriithi and Waweru (2017) investigated the relationship between liquidity risk measured by LCR and NSFR and bank performance. Their findings indicated that LCR does not have a significant influence on bank performance, whereas NSFR is negatively influenced by bank performance both in the short and long term. They recommended that bank managers pay more attention to liquidity management and, other factors affecting bank permeance besides the regulatory requirements (Muriithi & Waweru, 2017). Jaouad and Lahsen (2018) examined the relationship between the effects of bank-specific characteristics, financial structure, macroeconomic factors and bank performance. Slaim, Sathye and Hu (2015) and Makhusha and Nhavira (2017) investigated the relationship between other factors that affect bank performance, e.g. corporate governance.

There are also regulatory requirements that affect bank performance which are guided by CAMELS ratings. Gupta (2015) examined the relationship between bank performance, the health of the financial system and efficiency in the economy for both public and private banks using the CAMELS ratios. Chaudhry and Singh (2012), Prasad, Rivinder and Reddy (2011), Gupta and Kaur (2008) and Sarker (2005) empirically analysed the performance of banks according to the CAMELS ratings and its impact. The current study is different from earlier studies in three ways: firstly, because of the methodology deployed, and the sample coverage.

Secondly, the present study covers locally registered banks in terms of the Banks Act 94 of 1990 in South Africa, and this study covers the period during and after the financial crisis. Lastly, this study uses accounting ratio analysis and econometric techniques because they are useful for differentiating high performing banks from others, they tend to compensate for disparities, and they control for any size effect on the financial variables being studied (Samad, 2004). Moreover, accounting ratios and econometric techniques enable the researcher to identify unique strength and weaknesses, which itself inform bank performance and credit quality.

South African banks made a good test case for this study because they are unique in high-profit margins due to the oligopolistic nature of the market. To the best of the researcher's knowledge, no empirical analysis of bank performance and regulatory requirements has been done in South Africa. The previous studies conducted were based on the effects of bank performance and produced inconclusive results. This was motivation enough for the researcher in his bid to add to the body of knowledge. According to Lawa, Zogli and Dlamini (2017) and Sufian and Hbibullah (2009), bank performance can be measured by both macroeconomic factors, for example, unemployment and repo rates, and micro-economic factors, for example, capital adequacy and liquidity.

Bank performance has been extensively researched; however, the definition of ‘performance’ differs among studies.

Furthermore, while scholars have attempted to investigate the effects of bank performance in the banking sector, some only considered banking characteristics, whereas others considered macroeconomic factors. According to Akhatar, Ali and Sadaqat (2011), bank performance can be measured according to both micro and macroeconomic factors of an economy.

In this study, the focus was on the analysis of bank performance and regulatory requirements in South Africa and, the study adopted the stance of Akhatar *et al.* (2011).

1.5 PROBLEM STATEMENT

An analysis of bank performance and banking regulatory requirements in South Africa became more critical after the global financial crisis of 2007-2009. Amendments were thus made to the Basel guidelines relating to bank performance and bank regulatory requirements in order to address the financial crisis.

The present study analysed bank performance and regulatory requirements in the context of South Africa for several reasons. The first reason is that, despite the ready availability of data for both bank performance and regulatory requirements. The implementation of regulatory requirements remains a challenge in South Africa and globally while the bank performance and regulation relationship remain unresolved empirical issue.

Secondly, after the occurrence of the 2007-2009 global financial crisis, amendments to Basel guidelines on banking and supervision were made. The BCBS revised Basel II into Basel II,5 followed by Basel III being rolled out slowly until 2019 (Hull, 2015). Despite such efforts, bank failure still remains a global problem.

Thirdly, most previous studies focused on the impact of capital adequacy on bank performance. Few studies have investigated the effects of other Basel III requirements in the form of the NSFR and LCR.

As previous studies have been inconclusive, this study tested the relationship between bank performance and bank regulatory requirements. This study was conducted in the South African context and provided results consistent with both theory and literature.

1.6 Research questions

This study attempted to answer the following research questions.

1.6.1 Is there a relationship between bank performance and capital ratio?

1.6.2. Is there a relationship between bank performance and liquidity coverage ratio?

1.6.3 Is there a relationship between bank performance and net stable funding ratio?

1.6.4 Is there a relationship between bank performance and the selected microeconomic and macroeconomic variables?

1.7 OBJECTIVES OF THE STUDY

1.7.1 Primary objective

To determine the impact of regulatory requirements on bank performance.

1.7.2 Secondary objectives

- To examine the relationship between bank performance and capital adequacy.
- To investigate the relationship between bank performance and liquidity coverage ratio.
- To examine the relationship between bank performance and net stable funding ratio.
- To examine the relationship between bank performance and bank-specific variables and macroeconomic factors.

1.8 SIGNIFICANCE OF THE STUDY

The purpose of this study was to carry out an analysis of bank performance and regulatory requirements in South Africa. The study focussed on locally registered and licenced banks in South Africa in terms of Banks Act 94 of 1990, which are described in detail in Chapter 3. Furthermore, the study aimed to establish whether the regulatory requirements are observed and, if so, why some banks are failing. The research was quantitative in nature and used panel data regression analysis. Data were collected from the South African Reserve Bank.

Despite numerous international studies having been conducted on bank performance and bank regulatory requirements, research of this nature in the African context is very limited. This study contributes to the literature in the context of bank performance and regulatory requirements by explicitly focusing on the South African banking context.

The findings of this study will benefit decision-makers and policymakers in terms of providing advice to other small banks. This study also identified factors over which the South African registered banks have control and the way to manage those better, to ensure that capital adequacy and liquidity requirements are managed effectively. Identifying the banks' regulatory requirements will give the SARB, as the regulatory body, insight into ways of enhancing capital requirements to banks' organisational requirement practices better and to help maintain a sound performance in the banking sector. This study will also open doors for other researchers to perform further studies in the field.

1.9 LIMITATIONS OF THE STUDY

Data on banks in South Africa were only considered from 2009 to 2019, but there were missing data for some years. This issue was resolved by focusing on banks with complete data and eliminate some of the banks that did not have all the data for the target study period. The study was limited to locally registered banks that had operated during the entire study period, and the sample was identified as 12 banks. The study relies on secondary data, assuming it is a true reflection of actual events. Due to the mathematical measurement and difficulty required in estimating the banks' performance, in this study, accounting ratios were used to measure bank performance.

1.10 CHAPTER LAYOUT

Chapter 1: Introduction, problem statement and objectives

In the first chapter, the study introduced the research study as well as the goals and objectives of the regulations. It further gave an overview of the banking sector, bank performance and regulations, the problem statement, the objectives of the study, the significance of the study, the limitations of the study, and the structure of the dissertation.

Chapter 2: Theoretical framework

In the second chapter, the study discusses the main variables, describes the theoretical framework, and provides a summary of the literature reviewed on bank performance and bank regulatory requirements in general.

Chapter 3: Empirical studies

Chapter 3 focuses on observations and findings from studies conducted by different scholars on the topic of bank performance and bank regulatory requirements globally and in South Africa.

Chapter 4: Research methodology

Chapter 4 gives more detail on the methodology that was used to address the research objectives, as well as the research designs and econometric models used. Lastly, the generalised methods of moments (GMM) model selected for this study is discussed.

Chapter 5: Data presentation, analysis and interpretation

Chapter 5 provides an analysis and interpretation of the econometric test's results. The chapter begins by presenting descriptive statistics, followed by a cross-correlation analysis, and finally, a presentation, analysis and discussion of the empirical results as estimated by GMM.

Chapter 6: Conclusion and recommendations

Chapter 6 provides a summary of the findings and makes recommendations for the study, before offering concluding remarks on the theoretical and empirical results of this research.

This chapter also includes a summary of the contribution of this study to the existing body of knowledge on the effects of bank performance and regulatory requirements. Finally, the chapter highlights the shortcomings of this study and provides information on possible future research.

1.11 SUMMARY CHAPTER

This chapter began by providing an introduction to the relationship between banking regulations and performance. The theoretical linkage was highlighted, and the gap in the literature was clearly identified. The goals of regulations were discussed, with particular attention being paid to how bank regulations aim to provide stability and enhance performance in the financial sector. The South African regulatory environment was then introduced, describing the developments over time as well as the responsibility of the central bank in the formulation and enforcement of the regulations. The problem statement was formulated, and it was identified that research in South Africa on the linkages between bank performance and regulatory requirements (capital adequacy and liquidity requirement) is scant, and where it does exist, is contradictory. Specific research questions and the objectives of the study were presented, before the significance and limitations of the study were discussed. Finally, the structure of the dissertation was presented.

CHAPTER 2: CONCEPTUAL FOUNDATION AND THEORETICAL LITERATURE REVIEW

2.1. INTRODUCTION

This chapter focuses on the main variables as well as the theories behind bank performance. Moreover, this chapter lays a good conceptual foundation and discusses the literature reviewed in articles, scholarly journals, textbooks, published reviews, dissertations and other sources. Lwoga, Ngulube and Stilwell (2017) claimed that an analytical part of a conceptual framework is the use of theories and variables related to a study. In the following sections, two main variables of the study (bank regulations and bank performance) definitions, examples and the proxies for each variable are provided, before the context of these variables is described.

2.2 BANK REGULATIONS AND BANKS' REGULATORY REQUIREMENTS

Regulations are defined as a set of rules made by a government or authority to control an organisation or process (Makonko, 2016; Klomp & De Haan, 2015). According to Taranhike (2017), financial regulations are those laws and rules that govern what financial organisations, such as banks, brokers and investment organisations, must comply with, for example, regulatory frameworks and industry-specific regulations such as the Banks Act 94 of 1990.

Bank regulation refers to a form of government regulation which subjects' banks to certain requirements, restrictions and guidelines, which are designed to create market transparency between banking organisations and individuals or other organisations with which they conduct business (Elkelish & Tucker, 2016). According to Nyoka (2017), bank regulation refers to the minimum capital requirements, which clearly states that banks must reserve an 8% portion of their capital in compliance with the supervisory review processes that are mandated by the SARB and, complying with international regulations in terms of Basel III; these types of compliance determine for how long a banking organisation will remain in business from a regulatory point of view.

Vianney (2011) emphasised that capital requirements are bank regulation, which sets a framework in terms of Basel regarding how banks and depository organisations should handle their capital. Freixas and Santomero (2013) noted that it is the responsibility of a regulatory body to provide adequate minimum capital requirements and firewalls so that a financial crisis does not spill over to other organisations, as well as to minimise the likelihood of banks failing. The failure of a financial organisation is common in the banking sector and, may lead to another organisational failure within the same industry (Freixas & Santomero, 2013). Klomp and Haan (2015) concluded that consistency in complying with strict regulations would sustain a bank, prevent bank failures and increase efficiency.

A study by Alam (2013) examined whether bank regulations, legislation, supervision and monitoring minimise failures, and enhance technical efficiency and risk-taking behaviour across the globe. The study found positive results that legislation is an important instrument used by the government to minimise bank failures, organise society and protect its citizens, as legislation governs the rights and responsibilities of the individuals and authorities to whom the legislation applies (van Vuuren, Leenen, Phahlamohlaka & Zaaiman, 2014). The legislation regulates dealings between a business and its suppliers; regulates the rights and duties of people representing the organisation and ensures fairness; and it authorises, provides, sanctions, grants, and protects individuals within a business (Freixas & Santomero (2013).

According to Klomp and De Haan (2015), bank regulatory requirements have two main objectives, namely, to protect the interests of depositors, investors and creditors; and to safeguard the public interest by promoting the integrity and reputation of financial services markets. Dufey and Giddy's (1984) and the South African Reserve Bank's (2013) reasons for why banks need to be regulated include: monetary policy, the ability of the bank to create money; channelling of credit and investments and the allocation of credit; ensuring healthy competition and innovation amongst banks; and mitigating the problem of asymmetric information.

In light of the above, Howells and Bain (2005) stated that for banks to channel credit effectively, and investment well in the market, they should have adequate liquidity.

Following the financial crisis of 2007-2009, several banks experienced financial difficulties because they had failed to manage their liquidity (Marozva, 2015). The risk faced by banking organisations and their core role in financial intermediation has resulted in the banking sector becoming highly regulated worldwide (Taranhike, 2017). Some of the reasons for this include protecting depositors' funds, ensuring the safety and stability of the banking system, and protecting the safety of banks by limiting credit to a single borrower. For these reasons, the BCBS implemented an international regulatory accord that introduces a set of reforms designed to improve banking regulations using Basel.

The Basel guidelines were introduced in an attempt to formulate a banking regulatory framework worldwide. The shape of the regulatory framework varies from one country to another and affects bank performance and the risk-taking of banks in those countries differently. The BCBS introduced a consecutive set of rules and guidelines known as Basel I, II and III, each of which had different objectives (Naidu, 2011). Currently, the Basel IV regulations are guiding banks internationally in terms of application issues for standards.

Basel I was introduced to maintain financial stability by improving the quality of banking rules worldwide (Taranhike, 2017); it set out the minimum capital requirements of financial organisations to minimise credit risk. Basel I is also known as the Basel Capital Accord, and was intended for capital measurement and capital standards for the financial organisation for the coverage of international banks over their exposure to credit risk (Vousinas, 2015). Basel II followed in order to address the deficiencies identified in Basel I and to improve credit risk measurement in financial markets (BCBC, 2004; 2006) after substantial losses in the international market post-1992. Basel II also relates to the supervisory review process and explains the roles of banking supervisors and the powers conferred to them (BCBS, 2004).

Basel II was followed by Basel III, which is an international business standard that requires financial institutions to maintain enough cash reserves to cover risks incurred by their operations.

Basel III was introduced to protect the economies from the financial crisis of 2007-2009. The implementation of Basel III was intended to address loopholes in Basel II, and consists of the same three pillars as Basel II, namely, minimum capital requirements, supervisory review and market discipline (Boora & Jongra, 2019). Basel III is more stringent on bank regulations and consists of the following components: capital norms, liquidity standards, leverage and risk coverage (Chen, Shen, Kao & Yeh, 2017). Tanna (2016) noted that Basel III introduced stringent capital and liquidity standards to ensure financial stability. The aim was to ensure that banks accept a level of responsibility for the financial economy they operate in, safeguard against financial collapse, and implement a banking regulatory framework across the world (Nyoka, 2017; Taranhike, 2017).

The aims and objectives of the banking regulatory framework are meant to mitigate risk-taking by banks and to regulate the capital adequacy level that banks should keep to safeguard depositors' money in the event of bank failures (Triki, Kouki & Dhaou, 2016). Another aim of banking regulatory requirement is to improve banks' risk-taking as well as the overall performance of banks and the banking sector (Luvuno, 2018). Despite such efforts, banks are still failing, resulting in financial crises worldwide. Barth *et al.* (2013) noted that there have been more than 100 systemic banking crises in the world since 1970, and argued that these serve as an indicator that there are deficiencies in the banking regulatory framework around the world.

The South African banking system has also suffered financial crises resulting from bank failures. Insufficient liquidity, a poor bank regulatory framework, and inadequate management have been identified as some of the reasons for these failures. The South African Reserve Bank is the central bank in South Africa, and as such, is responsible for the prudential regulation of banks in pursuit of maintaining good financial system stability (SARB, n.d.).

This study adopted the definition of regulation proposed by Elkelish and Tucker (2016), Taranhike (2017) and Nyoka (2017), which emphasises the three pillars of Basel III: minimum capital requirements, supervisory review process and market discipline.

2.3 BANK PERFORMANCE

As a starting point, to be able to assess the effects that regulations have had on bank performance, a definition of bank performance needs to be provided. Rose and Hudgins (2010) defined bank performance as an analytical tool that was created by the Financial Organisation Examination Council to assist in supervising and examining banks. Bank performance examines liquidity, capital adequacy, earnings and other possible factors that could damage the stability of a bank (Arif & Nauman Anees, 2012).

Bank performance reflects the way in which banks uses their resources to achieve their objectives. Alternatively, it refers to the adoption of a set of indicators that serve as indicators of a bank's current status, and the ability of a bank to achieve desired results to maintain stability and sustainability (Kana, 2017; Rengasamy, 2012).

Bank performance further refers to how adequately a bank is meeting the needs of its stockholders, owners, employees, depositors, creditors and borrowing customers, as well as if it is keeping government regulators satisfied that their operating policies, loans, and investments are sound, and protecting the public interest (Rose & Hudgins, 2010). The adequate performance of banks is critically important to customers; the price and quality of the bank products determine efficiency and competition. Efficiency and competition cannot be observed directly, but some indirect measures in the form of simple indicators are used in both theory and practice (Boora & Jongra, 2019). According to Terreza (2015), performance measurements refer to a way of ensuring that resources available are used efficiently and effectively. The purpose of this performance measurement is to provide a bank's management with the maximum return on capital employed in the business.

Bank performance measures are interpreted differently by different scholars, there is no universal measurement. For example, some scholars measure performance using profitability, while others use net interest margin (NIM), liquidity, the balanced scorecard, financial matrices, the customers' perspective, or internal and external processes.

Many studies, such as those by Anouze and Bo-Hamad (2019) and, Kana (2017) and, Vianney (2011), measured bank performance according to two categories, namely internal and external factors. Internal factors focus on the profitability of the bank, which is in the control of bank management, and this is classified into two categories: financial statement variables and non-financial statement variables. While financial statement variables relate to the decisions which directly involve items from the statement of comprehensive income and the statement of financial position in formulating ratios, the literature shows that bank performance could be typically measured using the following variables: return on assets, return on equities and net interest margin. These measurements are usually expressed as a function of either internal or external determinants of bank performance (Kana, 2017). Non-financial statement variables involve, for example, the number of branches and the status of a branch. External factors are those factors that are outside the scope of bank management. Among the mostly widely discussed external variables are market power and regulatory requirements.

Klaassen and, van Eenghen (2015) observed bank performance from the market point of view, by assessing stock returns and, interpreting changes in the market opinions of the market and, future projections of the banks. Alternatively, the use of accounting figures to determine the ratios can be used as indicators of bank performance (Vianney, 2011). Return on assets (ROE) is one of the accounting ratios which is widely used in measuring bank performance and is expressed as a percentage of returns on a bank's average assets (Klaassen & van Eenghen, 2015; Arinola & Omolehinwa, 2012). ROE is linked through the equity of multiplier, which portrays the leverage of ROE that is due to the bank having debts (Popa, Mihallescu & Land Caragea, 2009). A high Equity Multiplier (EM) can be achieved through a high asset to equity ratio. In a case of positive ROA, it enhances the ROE, however, in a case of negative ROA, it lowers the ROE. The EM of financial leverage is a measure of both risk and profit, and high EM values show both high capital and solvency risk (Mac Donald & Koch, 2006).

Simerly and Lim (2000) noted that bank performance involves measuring an organisation's effectiveness, efficiency and use of resources in its operations to generate revenues. Measuring what is considered to be bank performance is one of the challenges of scholars, because no single parameter can stand alone to determine bank performance. Bank performance can be determined by a review of various parameters and a detailed analysis of different measures. Anouze and Bo-Hamad (2019) defined performance measurement as a way of ensuring that resources are available to be used in the most efficient and effective ways; the purpose is to provide the maximum return on the capital employed by the business. A bank's financial performance is very important as the board of directors, and stakeholders need to know how well the organisation is performing. The performance also determines the sustainability of the bank.

According to Orazalin, Mahmood and Jung Lee (2016), two accounting profitability variable ratios are used to measure bank performance, namely ROA and ROE ratios. Other studies use capital adequacy, asset quality, management quality, earnings, liquidity and sensitivity, for example, the CAMEL approach (Wang, Lu & Lin, 2012). The purpose of CAMEL is to determine a bank's management efficiency in terms of adhering to regulatory requirements and maintaining an effective internal control system and prudent practices. The net interest margin (NIM) ratio is used to measure management quality; the formula for NIM is net interest income/interest earning of assets (Liu & Sathye, 2019). A higher ratio reflects better management quality and therefore, better performance. The ROA and ROE are used as proxies for earnings quality; therefore, higher ratios indicate the effective and efficient use of a bank's assets in maximising shareholder value. The liquidity measure uses the loan to assets ratio (LOAN 1) and loan to assets (LOAN 2) (Matthews, Thompson, 2014).

This study adopted the definition of bank performance proposed by Arif and Nauman Anees (2012); and Rose & Hudgins (2010).

For the following reasons; in their studies they focused on examining liquidity, capital adequacy, the risk-taking behaviour that may affect the bank, meeting the needs of stakeholders, protecting the interest of the public and complying with regulatory requirements. They measure performance using ROE, ROA and NIM.

2.4 Theories of bank performance

The economic rationale behind bank regulations was developed in western economies, considering of implications raised by the 2007-2009 financial turmoil. The public interest and private interest theory of regulation are designed to explain why regulation is attempted. According to Ping (2014), the viewpoint of economic rationale for banking regulation under public interest theory, there is a convergence of the interest of the public and some interest of the regulated banks. The opportunity to operate in a stable banking sector could be recognized as part of the banks private interest as it enables the banks to achieve their goal of profitability. It is in the interest of banks to maintain a safe and stable banking regime that also confers benefit on the public. In this light, banking regulation not only captured under private interest theory, but also serves the economic objective stipulated by the public interest theory. Under circumstances where the public lacks mean to participate in the regulatory process, it relies heavily on regulatory authorities to strike a balance between the public and private interests (Ping 2014). In this instance, it is more likely that a private interest view of regulation would prevail as a regulation and can more easily be captured by private parties' governments and their officials than in a public participatory environment. Although the focus of this study was pessimist on theoretical framework.

The following section discusses theories on bank performance, which aid management in their undertaking to make the best decisions regarding the financing of their bank. There are numerous theories on the subject, and although these theories do not provide all of the answers, they do provide useful insights that could aid management in their decision-making processes.

2.4.1 The market power theory

The market power theory argues that certain market powers are needed for an organisation to achieve a good financial performance. These powers exist in the case of barriers of entry to certain markets (Ryan, Toole & McCann, 2014), for example, high capital requirements can be a barrier, giving existing players a chance to operate as a monopoly. The practice of market power theory leads to improved financial performance due to reduced competition. According to Keeley (1990), competition across financial organisations may lead to low profits or losses, which may lead to bank failures; therefore, a degree of market power is needed for banks to achieve a good financial performance.

Allen, Carletti and Marquez (2011) noted that poorly performing banks are forced to borrow from strong banks that have more market power. Credit assessments conducted by banks with market power ensure that subprime lending is avoided and, default payments are minimised. Massive capital requirement are needed to support the operations of a bank, which can be acquired from players with a high level of capital. According to Belkhaoui, Lakhal, Lakhal and Hellara (2014), the market power theory proposes two determinants of bank performance, namely market structure and strategic bank choice.

The strategic choice of a bank is either constant or unstable, depending on the market structure (Berger, Hasan & Zhou, 2010). According to market power theory, the determinants of an organisation's performance are market structure and management behaviour, which are the two most important factors used in achieving performance (Belkhaoui *et al.,* 2014). A study by Girardone, Georgios, Chortareas and Garza (2010) investigated the relationship between market power and bank performance and found a positive relationship between the market power structure and bank performance. Rodolfo, Ernesto and Mario (2005) concluded that when a study uses bank performance as a proxy, the results indicate that there is a cost efficiency within the organisation.

Cupian and Abduh (2017) noted that the market power theory captures the degree to which an organisation can increase its prices beyond marginal cost and represents it as a more accurate indicator in the market compared to standard concentration measures.

In summary, the market power theory deals with competition amongst banks in the market. Cupian and Abduh (2017) identified two components of empirical approaches for measuring competition, namely structural and non-structural approaches. The structural approach deals with modelling banks competition conduct, and performance paradigm with the hypothesis, that the market power of banking organisations increases with industry concentration and, by creating a direct link from industry and the competition environment. The structural conduct approach assesses the competitive environment that characterises market structure by applying ratios to the organisation using Herfindahl Hirschman Index model. Yildrim and Philippatos (2003) concluded that a rise in concentration is considered as the increase in collusive opportunities between banks, which guarantees higher prices and profitability. The second approach is the non-structural approach, which is based on the new empirical industrial organisations. The non-structural approach measures competition without using clear information about the market structure. Instead, it focuses on attaining estimates of the market's power from the observed bank's behaviour. According to this approach, a bank's high efficiency helps to increase its market share and profits. The competition can also be measured by Panzar-Rosse formula (1987), which suggests collective measures of competition and the Lerner index, which suggests individual measures for market power (Panzar & Rosse, 1987).

The Panzar-Rosse formula

$$1n\ TR_{It} = \propto + \beta 1\ inW1it + \beta 2\ inW2it + \beta 3\ inW3it + \beta 4\ inZ41t + \beta 5\ inZ2it + \beta 6\ inZ3it + \varepsilon it \quad (1)$$

TR_{It} is a dependent variable that represents total revenues, which is measured by the interest and non-interest revenues to total assets. The first input is W_1, which represents a proxy for input price of deposits; this can be done by taking the ratio of the total interest expense to total deposits and market funding. The second input is W_2, which represents the proxy input price of tangible assets and fixed capital. This ratio takes into account operating expenses over total assets. The third input is W_3, which represents a proxy for input price labour.

The first three equations were adopted from Nathan and Neave (1989) and Casu and Girardone (2006). Cupian and Abduh (2017) supplemented the analysis by adding the other three bank-specific variables: Z_1, which represents the ratio of net loans to total assets aiming to capture risk components; Z_2, which represents the total assets to account for possible scale economies; and Z_3, which signifies the equity ratio to total assets to capture the impact of capitalisation. εit represents a random disturbance term, and i represents a particular bank.

Nathan and Neave (1989) conducted a study on the competitiveness conditions and market power of the Canadian banking system. Their study used the non-structural estimation approach to evaluate the elasticity of total revenues for input prices. They used the Panzar-Rosse model, and the results revealed that the competition was perfect in 1982 and monopolistic competition from the period 1983-1984.

Cupian and Abduh (2017) conducted a similar study to Nathan and Neave (1989), but used Panzar-Rosse to examine the market power of the Islamic banking system in Indonesia. They added three variables to their model, which is Z_1, Z_2 and Z_3. The results revealed that Islamic banks in Indonesia operate at a higher degree of market power, which leads to a less competitive market. The banks earn revenues on the monopolistic competition.

A study by Apergis, Fafaliou and Polemis (2015) empirically assessed the level of competition in European banks and used Panzar-Rosse for the analysis. The empirical findings were robust, and indicated that European banks are still in favour of monopolistic competition.

The Panzar-Rosse (1987) formula offers a means of judgement amongst the different market structures through the reduction of the function at the individual's income of the bank. By contrast, the Lerner index measures the degree of market power by focusing on the pricing power in the difference between prices and marginal cost (Saurina, Jimenez & Lopez, 2007). Sahut, Mili and Ben (2012) concluded that the higher the values of the Lerner Index, the lower the level of competition amongst the banks. The formula for the Lerner Index is explained below:

The Lerner Index formula

$$LI = \frac{(P-MC)}{P} \quad (2)$$

The price of banking output is represented by *P* and *MC,* which signifies marginal cost (De Guevara & Maudos, 2007).

A structural conduct performance was developed by Mason (1939) and Bain (1951), and both postulate a one-way causality relationship from industry structure to organisation conduct, and from organisation conduct to industry performance. The structural conduct performance proposed a framework under which the market structure regulates organisation or industry conduct, and in return, the conduct regulates organisations and industry performance which are measured by profit or marginal cost. With this approach, industry performance and concentration normally measure profit ratios, concentration ratios and the Herfindahl Hirschman Index. De Guevara and Maudos (2007) criticised this approach due to its assumption that causality moves from structure to performance, although one can argue that conduct and performance can affect market structure. In addition, the limit of traditional measures is that the calculation of the degree of competition is chosen from indirect proxies, for example, market structure or market shares.

Classens and Leaven (2004) revealed that banks' behaviours are not only related to the market structure, but also other factors, for example, entry barriers, barriers of foreign and activity restrictions which are likely to limit the degree of competition.

Hamza and Kachtouli (2014) conducted a study on the competitive conditions and market power of conventional Islamic banks using a non-structural approach. Their study employed three measurements: concentration ratio and Herfindahl-Hirschman Index, Panzar-Rosse H statistic, and the Lerner Index, with the use of econometric estimations for evaluating the structure of market power by measuring its power using the price setting. The results revealed that under the Herfindahl-Hirschman Index, both markets were low concentrated, while the concentration ratios and the Islamic markets were considered moderately concentrated.

The econometric estimation results, using Panzar-Rosse H static were linked to the level of competition and the Lerner Index of market power. The results indicated that both markets (competition and market power) are categorised by monopolistic competition, and the Islamic banking system is expressed as banks with a high level of market power.

Tabak, Gomes and Medeiros (2015) examined the competitive behaviour of the Brazilian banking sector by analysing at what level individual banks take a risk in terms of market power. The results indicated that the Brazilian banking sector is more dominant in monopolistic competition, while another result indicated that the market power is negatively associated with risk-taking behaviour, regardless of the capital movements changes. Banks that encounter a decline in market power, meanwhile increase their capital levels are most likely to higher in risk-taking.

The above findings are in contrast with Cupian and Abduh (2017), whose non-structural approach measured competition without clear information about the structure of the market. Instead, it emphasised obtaining estimates of market power from the observed bank's behaviour. The formulas for the bank concentration ratio and the Herfindahl-Hirschman index are as follows.

The k bank concentration ratio

$$\mathrm{CR}k = \sum_{i=1}^{n} \mathrm{Si} \qquad (3)$$

The k bank concentration ratio is one of the most frequently used measures of concentration because of its straightforwardness. The ratio is created by adding up the market shares of the k largest banks in the market.

The formula for the Herfindahl-Hirschman Index

$$\mathrm{HHI} = \sum_{i=1}^{n} \mathrm{Si}\ \ 2 \qquad (4)$$

The Herfindahl-Hirschman Index is one of the traditional measures of the competition and concentration of the market. This formula is widely applied to estimate the degree of competition of a market (Hirschman, 1945; Herfindahl, 1950).

Si 2 represents the market shares of the organisations, while i and *n* represent a number of organisations, it simply means that the market is concentrated, and when the competition is weaker between market players, the market is considered to be in a monopoly position (Belkhaoui *et al.,* 2014). The higher the market concentration, the better the performance of the banks.

Shepherd (1986) criticised the market power theory by stating that the direct source of market power is the domination of participants over individual markets, independent of the ultimate sources of such domination, hence the emergence of the relative market power. Banks with large market share and diversified products that might exert market power to determine prices, are likely to make more profits (Mensi & Zouari, 2010).

Keeley (1990) pointed out that market power in the banking sector undermines the financial stability of banks, while Leon (2015) noted that the idea behind the competition in the banking sector is that market power is most likely to be harmful to banks. The next theory discusses financial intermediation in detail.

2.4.2 Financial intermediation theory

Gurley and Shaw (1960) noted that, over the past years, the theories of the banking sector were based on transaction cost and asymmetric information. According to Motelle and Biekpe (2014), asymmetric information hampers the efficiency of financial intermediation by increasing the gap between lending and deposit rates. The cost of assembling information between the depositor and the lender is high and often results in high borrowing costs. The transaction cost and asymmetric theory were intended to account for organisations that take deposits from the public and channel funds to investors. In recent years there have been some changes, including increased intermediation services, and expansion of banks' products varies from money and capital markets (Dzikiti, 2017). Although transactions and asymmetric information have declined in the market, financial intermediation is receiving more attention, for example, in South Africa, financial intermediaries serve as a middleman for financial transactions, generally banks, takes deposits from savers and lending to borrowers and lower the transaction cost.

Banks are no longer focusing on deposit-taking as their main role, however, and are engaging in numerous forms of intermediation. The financial intermediation theory defines how financial intermediaries' processes influence the economy of a country and the effects of government policies on financial intermediaries (Gurley & Shaw, 1960). The theory also emphasises the roles and functions performed by financial intermediaries in the economy (Curott, 2020).

Several studies conducted in this field emphasise the role and function of financial intermediaries in achieving sustainable economic growth and highlight the role of the SARB in the regulation, supervision and control of financial intermediaries.

According to Allen, Donald and Ndikumana (2000), the financial system reduces liquidity risk and facilitates the management of risk by investors, as financial systems collect and evaluate information more effectively than individual investors, for example, financial intermediaries enjoy economies of scale.

The principal goal of financial intermediaries is to maximise shareholder wealth. Decisions on investing, lending, borrowing, pricing, adding new services, removing of old services and other activities thus depend on shareholder wealth. The purpose of financial intermediaries is to create lower transaction costs for searching for potential investors, borrowers and managing the risk between the two and, mobilising savings and conducting an exchange of funds (Levine & Loayza, 2000; Kana, 2017).

According to Onuonga (2014), the deposit type of financial intermediaries are economic units, whose function is to obtain funds from depositors and others, then lend the funds to borrowers. As mentioned earlier, banks are one type of financial intermediary. Motelle and Biekpe (2014) noted that banks perform a high level of financial intermediation, particularly when it comes to transforming deposits into loans, which involves monitoring borrowers and the transformation of capital. In light of the above, banks play a principal role in intermediation by reducing the transaction costs of researching potential investments between depositors and borrowers.

The banks act as intermediaries between those who have money and those who need it. Commercial banks enhance economic efficiency and economic growth by allocating capital to its best possible users (Nyoka, 2017). One of the functions of financial intermediaries is the pooling of savings; they can help financial organisations to improve their performance by reducing transaction costs between borrowers and savers (Moen & Well, 2010).

Banks encounter uncertainties in the market. The main challenge of uncertainty is market resistance, such as transaction cost and information asymmetries, which translate to poor performance and market resistance (Motelle & Biekpe, 2014). Market resistance leads to a wedge between interest on a loan that has to be paid by borrowers and interest received by savers from their deposits (Beck, 2006). Beck (2006) further outlined the three main sources of market resistance, which is intermediation costs, limited options for the diversification of idiosyncratic risk.

Firstly, intermediation costs are linked to regulatory requirements, clearing of funds. Secondly, the limited options to diversify idiosyncratic risk encourage banks to include a risk premium in their lending rates. Lastly, information asymmetries lead to agency problem based on poor choices made on asymmetry information (Onuonga, 2014). Banks are finding it difficult to determine the accurate creditworthiness of borrowers and the monitoring strategies of loans from customers. This difficulty gives rise to the principal-agent problem characterised by adverse selection and moral hazard (Erturk, 2015).

According to Stiglitz and Weiss (1981), adverse selection and moral hazard are linked to the size of the financial intermediation. Motelle and Biekpe (2014) argued that the information limitation weakens the suitable determination of the borrower's risk profile and leads to a situation where interest rates are used as a screening instrument. Any factor that increases the financial intermediation spread by hiking lending rates may lead to an increased probability of default by borrowers. The higher cost of monitoring the project payment period of loans is likely to create moral hazard difficulties, because the loans are used to finance risky projects instead of the project for which the loan is granted.

The risk linked to the information asymmetry problem can be managed by indicating that financial intermediators serve as delegated monitors of the economy (Diamond, 1984). Banks regularly incur the cost of monitoring borrowers through the collection of information, which compromises the quality of screening of borrowers appropriately. The cost related to monitoring efforts is normally passed to borrowers in the form of higher lending rates.

Rashid (2011) agreed with the above reasoning and developed a model that examines the effects of foreign banks to clarify the high financial intermediation spread in domestic markets. The model indicated that foreign banks finance borrowers with low risk and leave the high-risk borrowers for local banks. Therefore, high-risk borrowers lead to credit risk, which is one of the causes of financial crises and affects the performance of the bank. In light of the above, the local banks feel the market pressure and react by increasing their lending rates. Creditworthy borrowers tend to borrow from foreign banks because of the low-interest rates charged. As a result, high-risk borrowers then borrow from local banks for the possibility of financial stability.

A study by Erturk (2015) showed that market resistance, such as asymmetry and transaction costs, drive a wedge between depositors and lending rates. Banks normally include a risk premium to their lending rate to manage credit risk, liquidity risk and interest rate risk. After the banks have granted a loan to a borrower, they remain exposed to the credit risk until the loan is fully paid.

During the term of the loan, there is the possibility that the borrower might default or fail to make regular payments, while another risk is linked to the provision of liquidity.

Liquidity is a concern to both borrowers and lenders. For effective liquidity, banks need to adopt Basel III, which specifically deals with liquidity management. Although bank liabilities are short term in nature, short term loans normally take longer than expected to be paid in full by borrowers. According to Kana (2017), short term loans allow the borrowers to improve their credit rating to be more favourable in terms of lending, and it also allows lenders to exercise more rapid control over borrowers who are defaulting.

As a result, banks need to finance the loans in a manner that guarantees that there will always be enough cash to honour the daily demand of depositors to avoid liquidity risk.

The profitable intermediation of banks depends upon an intermediary's ability to reduce transaction costs between borrowers and savers of funds using economies of scale. The reduction in transaction costs should be higher than the charge made by an intermediary as outlined in the following formula (Howells & Bain, 2005:17).

$$(y+C^{1}_{B}+C^{1}_{L}) < (C_{B}+CL) \quad (5)$$

Where C_B = Cost to the borrower in the absence of an intermediary;

C_L = Cost to the lender of funds in the absence of an intermediary;

C^{1}_{B} = Cost to the borrower when dealing through an intermediary;

C^{1}_{L} = Cost to the lender of funds when dealing through an intermediary; and

Y = The intermediary's charge for supplying the services.

According to Mathews and Thompson (2014), the role of transaction costs can be examined as follows in the absence of a bank as an intermediary: where *R* represents the rate of interest, *TB* represents the several costs incurred by the borrower and *TS* represents cost incurred by the saver.

The return to the saver $(R_s) = R - T_s$

The cost to the borrower $(R_b) = R+T_b$

The spread = $R_b = R_s=T_b+T_s$

The coordination of the condition in the above equations is the basis of the livelihood of banks (Makina, 2006). According to Mathews and Thompson (2014), the process of reducing transaction costs from intermediation meets the above condition in terms of the rate of interest.

The intermediary financial development can improve productivity through this channel because banks may reduce the cost of evaluating investment projects before making lending decisions. Therefore, this process would enable banks to make a better allocation of capital (Howells & Bain, 2005).

According to Dzikiti (2017), the purpose of financial intermediation theory is to regulate the money creation approach. The method of regulating the money creation process is linked to the liquidity and solvability of financial intermediation (Merton, 1995). Therefore, the regulation of financial intermediaries has a positive impact on the capital adequacy, refinancing and debt recovering method (Diamond & Rajan, 2000).

The bank capital affects the following: the safety of the bank, the ability of the bank to refinance, and the ability to collect repayments of loans from borrowers. The regulation of capital plays a crucial role in the financial economy of the country because it helps to maintain liquidity. The financial intermediation theory fails to evolve into a general and coherent explanation of the basic function of financial intermediate in the market and the economy as a whole, according to Ngonyama and Simatele (2015). Hester (1994) agreed, arguing that the financial intermediation theory focuses solely on the functions of banks and is no longer crucial in developing the financial system. Instead, the focus is on the products and services that are reducing the importance to the intermediaries, while they are unable to account for those activities which they have become central focus of many organisations. The financial intermediation theory thus fails to account for the activities which have become a central issue in many organisations.

To further understand how regulations impact bank performance, the capital structure theories are discussed in the next section. Although these theories do not provide all the answers, they provide a useful insight, which will assist management in their decision-making processes.

2.4.3 Capital structure theories

Myers (1984) defined capital structure as a mix of debts and equities that are used to finance the operations of the organisation.

The cost of the capital structure of an organisation is likely to be lowered through the implementation of effective capital structure decisions, and it increases shareholders' equity (Nyoka, 2017). Gitman (2009) noted that the corporate finance theory maximises profit and specified that the value of the organisation can be increased when the cost of capital is minimised.

The finance literature proves that there is a relationship between capital structure, performance and profitability. In the curent study, assessing the effects of capital structure on profitability will help the current researcher to understand the potential problems regarding bank performance and capital structure. What follows is a brief review of the existing theories of capital structure in their chronological order of development.

2.4.4 The agency theory

Since the publication of the seminal paper of Jensen and Meckling (1976) , there has been some great empirical work done on agency theory in several studies worldwide, which have examined the relationship between financial leverage and organisational performance. The separation of ownership and control in organisations results in a conflict of interest between shareholders and managers within the organisation and thus leads to agency cost (Dawar, 2014). According to Jensen and Meckling (1976), agency theory resolves the conflict of interest between shareholders and management as it can affect the efficacy of investment and liquidity decisions of management, which can cause an impact on working capital. Organisations with a weak monitoring system and a lack of discipline to decision-makers lead to a situation where managers may invest in projects with a negative net present value or fail to invest in projects with a positive net present value (Kwaku, Marfo & Ansong, 2013).

For various reasons, managers normally use the resources of their organisation to indulge in investments that personally benefit them, rather than maximising the profit of the organisation (Jensen, 1986).

Similarly, managers are reluctant to give up controls and try as best as possible to mitigate liquidation, despite acting in the best interest of shareholders (Harris & Raviv, 1988).

Therefore, the use of leverage in capital structure can minimise agency cost by encouraging managers to act in the best interests of shareholders by regulating the choice of investment (Myers, 1977). Therefore, increasing leverage can mitigate agency cost and have a significant positive effect on profitability and organisational performance.

Agency theory deals with conflict between two parties, namely the agency and the principal (Jensen & Meckling, 1976). The first part is the agency problem that may arise when the two goals of the principal and the agency are in conflict, and when it is difficult for the principal to verify what the agent is doing. Boyd (1990) noted that agency theory emphasises the monitoring effectiveness role of the board towards directors and behaviour uncertainties that might arise within the organisation.

According to Abou-EI-Sood (2012), agency theory is used as a mechanism, particularly in corporate governance, to address agency problems in assessing the organisational risk-taking, and applying risk management. For example, the board size, outside directorship, liquidity risk and market power are positively associated with a bank's risk-taking.

Business Finance (2011) defined agency theory as a relationship between shareholders and directors. This relationship occurs when principals hire agents to perform some duties. The purpose of agency theory is to resolve the conflict of interest that may arise between the principal and agent.

The credit relationship can be linked to an agency relationship when a creditor (the principal) lends some of his wealth to a debtor (the agent), who is committed to his capital payment and interest costs, with the conditions being established in a contract entered into between the two parties (Karamera, 2013). One can thus refer to a creditor and a debtor, where the principal (the creditor) wants the repayment of borrowed capital plus interest to maximise profitability.

The agency problem, therefore, arises due to possible conflicts of interest between the principal and the agent, which may incur a cost (Nyoka, 2017). In general, bank regulations, are established to solve agency problems.

Howells and Brian (2005) noted that the purpose of bank regulations is to solve the agency problems between customers of banks and banks because customers are less informed and thus more at a disadvantage about the affairs of the banks. The costs that may be incurred due to a dispute are called agency cost, which is discussed below.

2.4.5 Agency cost theory

Jensen and Meckling (1976) defined agency cost as the sum of monitoring expenditure by the principal; by the agent and residual loss; and a cost that arises due to a possible conflict of interest, particularly when both parties in the relationship are seeking to maximise their worth within the organisation. The challenge is that the agent will not always act in the best interest of the principal.

There is good reason to believe that the agent will not always act in the best interest of the principal because the agent may have his or her own interests to serve. For example, an agent may invest in certain projects which yield the best results in the short term to increase their bonuses (Naidu, 2011). It is in the best interests of the principal to limit the powers vested to the agent. These may be achieved by the establishment of proper incentives for the agent by the principal's willingness to monitor costs for the activities of the agent, so that the principal may not be disadvantaged.

According to Jensen (1986), agency cost is a type of internal organisation expense which arises from the actions of agents on behalf of the principal. These expenses arise in the wake of inefficiencies, disruptions and dissatisfactions, which may be caused by a conflict of interest between shareholders and the management of the bank. Kwaku *et al.* (2013) noted that the best way to reduce agency cost between the principal and the agent is by implementing financial incentives to the agent based on their performance, which will assist in motivating them to act in the best interests of the bank.

According to agency theory, the capital structure of the organisation should, therefore, minimise the potential opportunist behaviour in the organisation (Naidu, 2011).

For instance, a legal system that protects investors' rights by restraining opportunist behaviour by management.

Agency cost theory portrays regulatory requirements as a way of raising the quality of financial services by improving incentives to perform contractual obligations to avoid agency problems (Nyoka, 2017; Karamera, 2013). In the financial services industry, regulatory requirements create an outside discipline that controls and coordinates industry behaviour. Financial organisations benefit from regulations that enhance customers' confidence, increase the confidence of customers' transactions, and improve organisations' performance by creating profits. The agency cost theory reconciles conflicts between the interests of the organisations, customers and regulators (Lee-Ford, 2009).

Sibindi (2017) acknowledged that agency cost theory is more applicable to well-established organisations and hence does not necessarily explain the behaviour of smaller organisations.

Jensen (1986) also criticised the agency cost theory by proposing the free cash flow theory of debt. Free cash flow debt can be beneficial in motivating managers and their organisations to be efficient. Jansen (1986) defined free cash flow debt as the cash flow above the required funds for all projects that has a positive net present value when discounted at the relevant cost of capital. Conflicts of interest between shareholders and senior managers over payout policies are likely to occur when an organisation makes free cash flow (Jensen, 1986). Senior managers may have the motive to wrongly use the free cash flow for personal gain or making bad investment decisions (Rasiah & Kim, 2011).

According to Grossman and Hart (1982) and William (1987), agency cost can be reduced by high leverage and increases an organisation's performance by encouraging managers to act in the best interests of shareholders.

Abou-EI-Sood (2012) noted that the structure of a financial organisation gives rise to three circles of agency problems: between management and shareholders, between block holders and minority holders, and between internal and external stakeholders. According to Grove, Patelli, Victoravich and Xu (2011), the presence of block holders as governance positively influence the board decision making by monitoring of bank managers to mitigate agency cost.

A few studies claim that ownership concentration is associated with the risk-taking of the bank due to the monitoring role that regulation plays (Gropp & Kohler, 2010; Elyasiani & Jia, 2008). Levine (2004), Iannotta, Nocera and Sironi, (2007) and Shehzad, Haan and Scholtens (2010) argued that ownership concentration is linked to minimum risk-taking for various reasons. For example, the block holders are in a better position to negotiate management incentive contracts to align owner-manager interest compared to small investors; however, block holders are more effective in monitoring the management of non-performing organisations (Sibindi, 2017). Concentrated ownership reinforces the benefits of monitoring to avoid agency cost.

Relating this to bank performance, the agent, in this case, is the senior managers and board of directors of the bank, who are expected to act in the best interest of the principal, for example, the shareholders.

Financial decisions made by management about bank performance are expected to benefit shareholders through the profitability of the organisation using the capital structure. Capital structure is an indication given by managers to shareholders as a way of promoting efficiencies and minimising inefficiencies that may be caused by information asymmetry (Handoo & Sharma, 2014). According to Jensen and Meckling (1976), the optimal capital structure can be obtained by trading off the agent cost against the benefit of debt. The optimal structure can be obtained through a tradeoff between liquidation and higher investigation cost (Sibindi, 2017). A conclusion was made by Grove *et al*. (2011) that the higher the leverage can be, the larger the organisation, the lower the probability of reorganisation following a default, and the higher the debt level. The optimal capital structure can be traded off between the benefit of debt and the cost of debt, based on the fact that managers are likely to issue debt only when they fear a takeover (Stulz, 1990). Diamond (1989) and Hirschleifer and Thakor (1989) argued that the use of debts to finance high-risk projects rather than using equities, is likely to be reduced as the reputation of managers will be at risk. While principals work hard to maximise their expected return on equities, agents also work hard for the benefit of the organisation.

Diamond (1989) argued that older organisations choose less risky projects to reduce the risk of default, which leads to lower cost of debts. Therefore, this theory suggests that small organisations are likely to have less debt than bigger ones. Agency theory has shed light on the capital structure; however, it does not detail all the differences in capital structures observed in practice (Singh & Sharma, 2016).

Gwatidzo (2008) introduced mitigation strategies to resolve the conflict between management and shareholders as follows: firstly, the issuing of debts as opposed to equities obliges management to legally bind themselves to a certain level of payment to lenders, which reduces opportunist behaviour. Secondly, the issuing of short term debt binds management to the negotiation table regularly. Therefore, management is punished by the creditors when they are seen to be harming creditors. Thirdly, in the event of long term debt being issued, it must be secured by collateral.

Lastly, by increasing the debt level in organisations where the potential for opportunist behaviour is high. Despite these mitigation strategies, this theory has been criticised by researchers for various reasons.

Perrow (1986) criticised agency theory by arguing that it only focuses on the agent side of the principal problem, and neglects that the problem may also arise from the principal side. Perrow commented that agency theory is not concerned about the principals who deceive, shirk and exploit the agent. In addition, the agents are forced to work in an extremely risky working environment and without any scope of intrusion where principals act as an opportunist. Perrow argued that there is another way that humans are principled and work ethically for the benefit of the organisation, by acting in the best interest of shareholders. This type of argument is common in the finance literature, and is becoming prominent as the stewardship theory (Donaldson, 1990).

Researchers such as Eisenhardt (1989), Sanders and Carpenter (2003) and Pepper and Gore (2012) criticised agency theory on numerous grounds, and proposed a different theory called behavioural agency theory. This theory argues that agency theory only emphasises the principle and conflict of interest, agency cost and reliant on both parties to minimise agency problems.

The agency theory assumes a contractual relationship between the agent and the principal for a specified or unspecified future period when the future is uncertain (Panda & Leepsa, 2017). The theory assumes that creating contract eliminates the agency problem, however practically it faces many limitations such as information asymmetry, irrationality, fraud, and transaction costs. The shareholder's interest in the organisation is only to maximise their equities; however, their role is limited to the organisation. The role of directors is only to monitor managers, and their further role is not defined. Agency theory considers managers to be opportunists and ignores the competence of the managers.

2.4.6 Market discipline theory

Market discipline is mostly used in financial regulations. According to Bliss (2014), market discipline refers to the prevention of excessive risk-taking by banks, by regulators and by market participants utilising market prices as a sign of creating problems. Market discipline refers to obligations by banks to comply with regulatory requirements in managing the stakeholder's risk on a day-to-day basis.

Nier and Baumann (2003) developed a theoretical framework for market discipline which includes the risk-taking of the bank, the extent of the government safety net, the degree to which uninsured liabilities finance the bank, and the extent of banks' risk choices. According to Flannary (2001), market discipline refers to the power of investors, customers and the risk-taking agencies to assess and control the level of risk behaviour by banks. Banks are required to publicly disclose their financial operations to ensure financial transparency in the form of disclosure. The purpose of disclosure is to discourage banks from taking an excessive level of risk. The level of risk-taking by banks not only affects their ability to make loans; it also affects the interests of existing stockholders and market participants, namely account holders, depositors and borrowers.

Market discipline limits the banks' level of risk-taking because risk reflects on the disclosure of financial statements, and prospective clients and investors may respond negatively to that particular bank. According to Nyoka (2017), market discipline encourages banks to complement the minimum capital requirements.

The purpose of using market discipline as an adjunct to supervision in the regulation of capital in the banking sector started in the mid-1970s (Castagnolo & Ferro, 2013). Following the financial crisis of 2007 - 2009, market discipline has become the central issue in financial markets. The most recent global financial crisis pushed regulators to improve regulatory requirements in the banking sector. The purpose of regulatory requirements is to minimise the possibilities of financial crises. The rigorous Basel III not only reinforces capital buffer requirements, but it also extends regulations to a risk-weighted capital framework for liquidity and leverage in bank regulations.

According to the literature, capital regulation and market discipline facilitate the improvement of stability for the organisation (Demirguc-Kunt & Huizinga, 2004; Kane, 2000). Capital regulation improves the banking sector's capital buffer, and at the same time, may negatively impact the risk-taking level of the bank (Blum, 1999). Banks that take more risk in response to capital regulation are likely to experience liquidity problems. Further, the impact of market discipline may bypass government regulations in some countries (Barrios & Blanco, 2003).

The purpose of capital regulation is to promote financial stability and the soundness of the economy of the country in which the banks operate. According to Rose and Hudgins (2010), there are three reasons for capital regulations, namely, to minimise the risk of failures, to maintain public confidence, and to minimise the losses to the SARB arising from deposit insurance claims. These regulations have been strengthened by the introduction of the Basel Accords that regulate banks' capital requirements, Basel III in particular. The purpose of Basel III is to make each bank's capital holdings proportional to its potential credit losses (BCBS, 2006). For this reason, capital has long been characterised as one of the key factors to be considered when the safety and soundness of a particular bank are being assessed (Bliss, 2014).

In analysing a bank's level of risk-taking, an adequate capital base serves as a safety net against some risks to which the organisation is exposed in the course of its day-to-day operations. In this way, capital absorbs possible losses and provides a basis for maintaining a depositor's confidence in a bank.

Capital also serves as a determinant of a bank's lending capacity. According to Osei-Assibey and Asenso (2015), the availability of capital determines not only the maximum level of assets that banks hold, but also the amount and the cost of capital impact on their efficiency and competitive position.

In cases where banks fail to comply with the regulations, investors may tacitly punish them for their lack of prudential risk management by insisting on higher returns on investments or terminating the investment (Flannery & Rangan, 2008).

There is growing research on the safety net in the banking sector, for example, Berger, Hassan and Zhou (2009) investigated the privatisation of banks in China; Wu and Bowe (2012) examined the relationship between information disclosure and depositors' behaviour; and Omotala, Roya and Safoura (2011) analysed the risk management practices and management efficiency of banks. Remarkably, after comparing many studies on regulatory requirements efforts and bank behaviour in developed countries, it is evident that fast-growth of the economy worldwide has brought the attention of regulators closely in the banking sector.

The China Banking Regulation Commission (CBRC) adopted Basel III and made it compulsory for banks in China to comply with capital regulations in 2004. The banking sector in China responded more positively to the regulator pressure imposed by the CBRC, including market discipline, than western countries. Chinese banks are rated top of the world according to their size, market capitalisation, profitability and other key risk indicators.

The financial system of China could improve by imposing a compulsory capital buffer against unexpected losses (Xu, Lee & Fu, 2015). In terms of the risk-weighted regulatory framework, banks are normally required to have a bigger capital buffer when they are taking greater risks. Banks may be required to limit their level of risk-taking behaviour under capital restrictions. Although existing studies show that both under- and well-capitalised banks improve their capital assets ratio, there are arguments about the impact of capital regulation on bank risk levels.

A study by Gennotte and Pyle (1991) in the US found that strict capital regulation increases the probability of bank failures; they argued that compulsory capital ratio requirements may prompt banks to invest in more risky asset portfolios. On the other hand, Kim and Santomero (1988) were against investing in more risky asset portfolios, and concluded that banks should minimise their level of risk-taking when it comes to risky asset portfolios.

In European countries, Rime (2001) and Ediz, Michael and Perraudin (1998) concluded that banks can improve their capital ratios by minimising the level of risk-taking.

Heid, Porath and Stolz (2004) revealed that under-capitalised banks are likely to lower their level of risk and increase their capital levels concurrently. However, well-capitalised banks are likely to take more risks when their capital ratio increases.

In African countries such as Ghana, the recent regulatory capital adjustment that was introduced by Basel III in the banking sector has introduced significant improvement in bank performance. Regulators have highlighted the various risks that concern the banking sector in Ghana, and these were addressed by the Basel III capital requirements. The banking sector regulators in Ghana have substantially increased the capital minimum requirements on three separate occasions since 2003. These developments forced the banking sector of fairly well-capitalised banks to increase their stated capital from GHe 16.2 million to approximately GHe 1.700 million in 2001 and in February 2012. In 2013, the stated capital of banks was increased to GHe 23,45,4; million each year, the growth rate was exponential (Osei-Assibey, 2015). The purpose of these increases was to ensure that banks keep their capital well in excess of the minimum required on their balance sheet.

In addition to capital regulation, market discipline, as another form of safety net, can also have an impact on bank capital buffers and increase risk the level of risk-taking (Kane, 2000; Demirguc-Kunt & Huizinga, 2004). According to Barrios and Blanco (2003) and Gropp and Heider (2008), bank capital build-up is driven by market discipline. Bliss and Flannary (2002) argued that market discipline enforces external sanctions on banks.

The depositor is considered to be the core component of market discipline, and again, the depositor constantly monitors the level of risk-taking by the bank.

The aim of introducing market discipline theory was to prevent excessive risk-taking of banks by regulators; however, this theory failed to prevent banks from risk-taking, which caused the financial crisis in 2007-2009 (Min, 2015). According to Vanhoose and Vanhoose (2007), the market discipline theory failed more completely than has previously been acknowledged. A foundational premise of market discipline was that regulators would monitor risk, which would lower the liquidity of the affected banks.

That being said, there was no such reaction from the regulators until after the financial crisis had already begun. The market discipline relies too heavily on investors who are not willing to take an extreme risk with their money, this is because the world has more risk aggressive investors than risk averse investors. As a result, this serves as poor monitors of banks and neglects the effects of bank shareholders, who are extreme risk-takers but may have incentives averse to those of public policy. Stephanou (2010) conducted a study on market discipline exerted on various liabilities of major banks, and none of the key prudential provided signals on the risk-taking of banks or showed any indications of elevated risk until long after these banks had taken the actual risk.

Berger (1991) concluded that the literature is concerned primarily with whether the bank liabilities react adversely to information regarding the risk. However, this theory fails to reveal the degree to which market discipline is effective as an incentive scheme; for example, to what extent does market discipline influence bank behaviour?

2.4.7 The buffer theory of capital adequacy

Capital adequacy is used to measure the amount of the bank's core capital and is expressing it as the ratio of its capital to its weighted credit exposure in the form of loans (Economic Times Bureau, 2010). Another name for capital adequacy is risk-weighted assets, which are used to protect depositors' money, encourage stability and protect financial systems.

The purpose of capital adequacy is to have banks hold a certain minimum percentage of shareholders' capital, depending on the total amount of loans given to customers and the level of risk-taking of the bank, which is on average 9.75% (BCBS, 2015).

The capital adequacy buffer theory is one of the determinants of bank performance, according to several researchers. The theory of capital adequacy explains why banks need to hold higher capital levels and shows the relationship between the two variables (Abou-El-Sood, 2012). The purpose of this study is to show whether there is a relationship between bank performance and regulatory requirements.

The most significant recent reform in international banking regulation has been in the area of capital adequacy. Questions were raised as to why capital adequacy was adopted as a tool for international banking regulation (Zheng, Xu & Liang, 2012), to which the response was that many banks failed during the financial crisis of 2007-2009. These failures have been attributed to poor governance practices that failed to manage liquidity risk and capital adequacy (Abou-El-Sood, 2017).

According to Furfine (2001), the Boards of Directors (BoD) contribute to the failure of banks for the following reasons: failure to assess the risk-taking of the bank; failure to assess liquidity risk; failure to manage capital adequacy; and failure to act with prudence. These failures led banks to economic shocks. Banks are expected to be effective monitors of other banks' performances. The main issue that concerns bank regulators is mitigating excessive risk-taking.

Abou-El-Sood (2017) pointed out the causes of bank failures and bank runs, which are due to mismatching assets and liabilities. The importance of mitigating bank runs in financing activities and injecting liquidity in the economic system is influenced by capital regulatory requirements interest because it helps to mitigate excessive risk (Bryant, 1980).

The regulatory capital requirement is one of the measures of modern bank performance. According to Rochet (1992), it provides banks with a buffer when they are in poor economic condition, and also serve as a mitigation mechanism in advance of risk-taking.

Numerous arguments have been made since the introduction of Basel III regarding whether adequate capital adequacy can effectively minimise the risk-taking of banks; several debates have focused on the theory of capital adequacy and regulatory practices (Zheng, Xu & Liang, 2012).

Banks are required to hold a minimum capital to cover the costs that may occur in case of a breach of a set of regulation (Nyoka, 2017). Calem and Rob (1999) maintained that banks need to hold sufficient capital to minimise the chances of failing to comply with regulatory requirements because non-compliance leads to penalties.

Allen *et al.* (2011) noted that there is a relationship between capital and risk-taking; non-compliant banks with minimum capital adequacy tend to take more risks, which leads to bank failures. Compliant banks with minimum capital adequacy are likely to invest in risky portfolios and anticipate higher profits, which may be used for continuous improvements in their capital position (Rime, 2001).

According to Zheng *et al.* (2012), regulators define the highest limit of bank ratio debt-equity as a capital controls mechanism. Regulators believe that capital can be used to buffer the risk, which guarantees the bank's solvency for depositors and borrowers when the value of assets falls below the market value. Both the theoretical and empirical studies conducted to determine the relationship between bank regulations and financial performance showed different results. Calomiris and Klein (1991) argued that banks that hold capital above the minimum requirement could negatively affect the performance of the bank, especially profitability, therefore holding more capital does not necessarily benefit the banks. Holmstrom and Tirole (1997) conceded that capital improves monitoring activities, and the higher the capital, the higher the return on equities.

Ofoeda, Gariba and Amoah (2016) noted that regulations affect the profitability of a bank; however, it is not clear whether it decreases or increases profitability. The regulatory activities of banks alleviate the conflict of interest between banking and security underwriting, and prevent management from engaging in risky decisions.

The regulatory requirements may, however, deprive banks of the opportunity to diversify their asset portfolios or exploit their economies of scale, and thus lead to a higher probability of failure.

In the USA, the risk-based approach is used to emphasise the importance of capital adequacy requirements gradually, for the reason that the bank's capital is considered to be a cushion that allows banks to absorb adverse shocks (Abou-El-Sood, 2017). Therefore, regulators use the risk-based capital adequacy requirements to minimise excessive risk-taking by banks (Abou-El-Sood, 2012). Yet regulators impose penalties on those banks that hold below minimum requirements of capital.

US banks and the Federal Deposit Insurance Corporation (FDIC) classify the range of regulatory capital requirements as follows: banks with a tier 1 capital ratio and above 6% are classified as well capitalised (Haubrich, 2020; Anat & Hellwig, 2013); and banks that fall below the minimum regulatory requirements set by the Basel Accord (4% for a tier 1 capital ratio) need regulatory involvement, which is costly. The cost of regulatory involvement is likely to escalate to bankruptcy, should the bank become significantly undercapitalised. The level of regulatory tier 1 capital is a significant determinant of a bank's health and performance (Pradhan & Shrestha, 2017). However, the level of regulatory tie one capital raises questions about whether banks' capital adequacy requirements affect the link between bank performance and risk-taking.

Some research focusing on capital adequacy affecting bank performance and moral hazard theory is dominant, which regards capital as an external factor and analyses why banks chose risk assets. Pradhan and Shrestha (2017) and Okafor, Ikechukwu and Adabimpe (2011) revealed that the total amount of risky assets are likely to be decreased by the adequacy regulation.

In supporting this theory, Gropp and Heider (2010) made an argument that the buffer capital adequacy has several functions, for example, to promote, to protect, to regulate and for operational functions which are discussed below. The promotional function explains how banks ensure that they have enough capital to meet stakeholders' expectations and promote growth to protect the bank.

These can be done by mitigating unexpected losses and ensuring business continuity is tested and reliable. However, it is management's duty to ensure that adequate capital is reserved. Should there be unexpected losses, these losses will be covered against the reserved capital. In light of the above, it is important to protect the bank from a breach of capital requirements. Regulators and the operational function support banks' activities and ensure volumes, which will lead to improved profits.

According to the buffer capital adequacy theory, banks are likely to act aggressively by increasing their loan book without increasing the minimum capital requirements.

For banks to mitigate this risk, they must set their minimum requirements higher than the threshold of the regulators (Musyoka, 2017). The excess capital will normally lead to increased operations, which will improve bank performance.

The buffer capital adequacy theory was criticised by Allen, Carletti and Marquez (2011), who stated that banks that hold capital above minimum regulatory requirements do not prevent banks from failing due to a financial crisis. The buffer capital adequacy theory is relevant to this study because it supports holding access to capital. Holding access to capital will lead to a reduction in costs, which may lead to penalties in the case of a breach of regulatory requirements. It may also support the operations of the bank to improve its performance.

2.5. SUMMARY CHAPTER

In this chapter, key terms were explained, for example, regulatory requirements and bank performance. In regulatory requirements, it was noted that there are four Basel Accords: Basel I, Basel II, Basel III and Basel IV. These requirements and capital structure theories were discussed.

On the performance side, three definitions of performance were discussed; however, the study adopted the definition of Rose and Hudgins (2010) and Arif and Nauman Anees (2012) as their studies focused on ROE, NIM and ROA; the risk-taking of a bank; meeting the needs of stakeholders; protecting the interests of the public; complying with regulatory requirements; measuring performance using liquidity.

The general theories of bank performance were also discussed, namely: market power, financial intermediation and trade-off theory, furthermore, the bank performance theory, which is explained by capital structure, was discussed; the buffer theory of capital adequacy, agency theory and market discipline theory. In the next chapter, the empirical research section discussed.

CHAPTER 3: EMPIRICAL STUDIES ON BANK PERFORMANCE AND REGULATORY REQUIREMENTS

3.1 INTRODUCTION

This chapter examines empirical studies conducted by different scholars on bank performance and regulatory requirements around the world. Subsequently, quantitative theories used in the studies conducted on the relationship between bank performance and regulatory requirements are assessed.

3.2 Empirical studies on regulations and bank performance

Bank regulations are the main factor that affects bank performance; they are the determinant of financial crises. Kale, Eken and Selimler (2015) and Naceur, Naceur and Omran (2010) conducted a study on the effects of bank regulation on bank performance and observed that structural bank regulations affect bank performance positively or negatively in both developed and developing countries. In the case of structural prudential regulation, this affects bank performance positively. Vanhoose (2007) concluded that the existing literature is insufficient to identify the real effect of structural regulations on bank performance. For this reason, the current researcher wanted to conduct further empirical studies on regulations and bank performance.

3.2.1 General bank regulations and bank performance

Taranhike (2017) conducted a study to establish the relationship between bank regulations and supervision, using bank performance and risk-taking as variables. Panel data from 15 South African banks between 1999 and 2010 were employed. The overall findings indicated that bank regulations and supervision variables did not have statistically significant effects on bank performance and risk-taking. These findings were grouped into three categories, namely large banks, medium banks and small banks. For large banks, their capital requirement improves their performance by enhancing their net interest margin and minimising operational costs. Performance, such as the restrictions and supervision of banking activities, however, does reduce credit risk-taking for large banks.

For medium banks, capital requirements enhance cost efficiency, whereas supervision increases the operational costs of the bank. The capital requirements minimise credit risk-taking and overall bank risk-taking. For small banks, restrictions on banking activities negatively affect the performance of the bank. The restrictions on, and supervision of, banking activities reduce credit risk-taking for small banks, whereas the capital requirement increases credit risk-taking. The conclusion is that banking regulations and supervision must accommodate the different sized banks.

Ofoeda *et al.* (2016) examined the relationship between regulations and bank performance, and found that there is a significant positive relationship between minimum capital adequacy and the profitability of a bank. Keeping minimum capital adequacy ratios has resulted in improved performances. Capital regulation is thus an effective tool in ensuring the stability of a bank, and it improves bank performance.

Lee and Lu (2015) examined the impact of bank regulation and supervision on bank performance, efficiency and fragility in the USA for the period 1999 to 2011. A regression model was used to analyse a sample of 53 banks. Their findings indicated that capital regulation requirement minimises bank fragility and when measured by non-performing loans and, when measured by a high level of NIM, it reduces bank efficiency and supervision practices that strengthen private sector monitoring of the bank. The conclusion can be made that findings support Basel III first and the third pillar, which are capital requirement and monitoring.

Zeidan (2012) examined the effect of violating bank regulations on the financial performance of the US banking sector for over 20 years (1990-2009). An analysis of 84 banks in the US was conducted using panel data. The purpose of the study was to assess whether the regulatory framework was effective in curbing violations. This was done by analysing each violation by the banks and comparing them against the performances of non-violating competitor banks. The study found contradictory results as there was a negative effect of violation on performance, yet a failure to impose any significant enforcement actions on banks that were not complying.

The study Suggested that policymakers and regulators should impose sanctions and speed up the process to minimise violations.

Yusuf and Ekundayo (2018) examined regulatory sanctions from an emerging economy perspective by analysing the impact of regulators' monetary sanctions on bank performance for banks in Nigeria covering 2006 to 2015. Panel data were used to analyse the data of 15 deposit-taking banks in Nigeria. The results indicated that fines imposed by regulators in the Nigerian banking industry had no significant impact on the bottom line of the banks. This is because the Nigerian banks consider the fines imposed by regulators to be operational expenses, and transferred them to their customers in the form of bank charges. The Nigerian study differed from other studies that examined the effect of sanctions on performance by focusing on financial performance using data from an emerging economy that is perceived to have weak regulatory requirements.

Rachdi and Bouheni (2016) investigated how regulatory and supervisory requirements affected the risk performance of European banks from 2005 to 2011. A sample of 60 large banks was used for six different countries in Europe, and panel smooth regression was used to analyse data. The results revealed that the effects of regulations, supervision and risk on bank performance were conditional because of the improved results compared to studies conducted earlier on, banking governance in Europe by the central bank.

Soile-Bologum (2017) examined bank failures and the impact of regulatory reforms in Africa covering the period 1992 to 2014. A sample of three banks in five countries (Ghana, South Africa, Nigeria, Uganda and Zambia) and panel regression were employed to analyse the data. Bank performance was measured using ROA, net interest margin and return on capital employed, capital-asset ratio, loan to deposit ratio, liquidity ratio, loan loss reserves to gross loan ratio, and cost to income ratio. The findings revealed that the regulatory measures adopted so far in African countries have not been significant in achieving the desired impact on overall bank performance concerning compliance with prudential guidelines and requirements.

Majumder and Li (2017) investigated the impact of bank capital regulatory requirements on bank performance and risk in the emerging economy of Bangladesh's banking sector for 2000 to 2015. A GMM was used to analyse a sample of 30 banks in Bangladesh. The results revealed that banks' capital regulatory requirements in Bangladesh positively and significantly affected bank performance, whereas there was a negative impact on risk. The study also revealed that there was a persistence of performance and risk from one year to the next.

Aktas, Acikalin, Bakin and Celik (2015) examined the determinants of capital adequacy in South-Eastern Europe (SEE). The period of the study was from 2007 to 2012, and the study used the following dimensional explanatory variables: size, performance, leverage liquidity, NIM and risk. The feasible GLS regression model was used to analyse the data of 71 commercial banks belonging to 10 countries in SEE. The results indicated that among bank dimensional explanatory variables, the size, performance measured by ROA, liquidity, NIM and risk had a significant positive relationship with CAR.

Assibey and Aseno (2015) investigated the influence of the regulatory capital on commercial banks in Ghana. A GMM model was used to analyse the data of commercial banks in Ghana based on a survey by PWC. The results indicated that there was a significant positive relationship between NIM and CAR. They also found that a high net minimum capital requirement would widen the spread between the lending rates and savings rates.

Different methods were used to measure the relationship between bank regulation and bank performance by different scholars; some used Basel III, while others used capital regulatory requirements, ROA, capital employed, banking supervision, liquidity ratio, deposit ratio and bank-specific variables. Different results were captured, Yusuf and Ekundayo (2018), Soile- Bologum (2017) and Taranhike (2017), found no relationship between bank regulation and bank performance, while Zeidan (2012) found a negative effect of a violation on performance. Majundu and Li (2017), Ofoeda *et al.* (2016), Rachdi and Ben Bouhen (2016) meanwhile, found a positive relationship between bank regulation and bank performance.

Most of the studies focused on Basel II credit risk management and supervisory review process; however, this study focused on Basel III capital adequacy requirements and the risk-taking of banks.

3.2.2 Capital adequacy and bank performance

Okafor *et al.* (2011) examined the impact of capital adequacy on bank performance in the banking sector in Nigeria. They sampled 20 banks from the Nigerian Stock Exchange covering the period 2000 to 2003 using the regression model and the least square model. Capital was used to measure the capital adequacy ratio, while performance was used to measure net profit before tax. The study found the following four results: firstly, holding adequate capital in terms of the regulatory requirements does not guarantee bank performance – banks need to have risk assessment strategies commensurate with such capital, which will improve bank performance. Secondly, factors such as management style and the environment in which a bank operate needs to be taken into consideration to enhance performance. Thirdly, the problem with banks is not about having adequate or less adequate capital, but the lack of risk assessment in their internal control processes. Lastly, non-compliance with capital adequacy requirements appear to be one of the issues that negatively affect bank performance.

Zheng, Xu and Liang (2012) examined the relationship between capital buffers and risk-taking behaviour of the bank. Their study was conducted with a sample of 14 commercial banks in China using GMM estimations for the period from 1991 to 2009. The estimation of results indicated that there is a statistically significant positive relationship between capital buffers and risk-taking behaviour of the bank. They further indicated that banks with a minimum capital requirement, decreases the level of risk, and when capital increases, the level of risk increases as well.

Almazari (2013) examined the relationship between capital adequacy, cost-income ratio and the performance of nine Saudi banks in the Stock Exchange Market (SEM) for the period 2007 to 2011. Data were analysed using a linear regression method, with the results revealing that there is a significant positive relationship between capital adequacy, the cost to income ratio and bank size with the performance.

In the Saudi Arabia study, profitability was measured by ROA and ROE and was found to have a negative relationship with capital adequacy and bank performance. Lastly, there was a negative relationship between cost to income ratio and profitability. The conclusion was reached that capital adequacy improves bank profitability and helps to reduce unexpected costs, such as financial distress not limited to bankruptcy.

Sulaiman and Mohammed (2014) assessed the impact of capital adequacy on financial performance in terms of profitability saving mobilisation. Data were collected from Nigerian corporation banks from 1997 to 2011. The study used the ordinary least square method of regression on a time series of data, with the results indicating that there is an insignificant impact of capital adequacy on financial performance. The study concluded that financial performance is not influenced by capital adequacy.

Okoye *et al.* (2017) also conducted a study on the effects of capital adequacy and bank performance using selected banks in Nigeria for the period 2010 to 2015. The data were subjected to statistical analysis using the Pearson coefficient variant of correlation, multiple regression analysis, variance inflation factors, multicollinearity, the heteroscedasticity test and the Hausman test. The study revealed that there is a significant positive relationship between capital adequacy and bank performance, and empirically verified that capital adequacy has a statistically significant effect on bank performance at a 5% level of significance. The study recommended that banks should not rely more on debt because their proportion of debt affects their capital structure and increases their risk of financial distress and bankruptcy.

Pradhan and Shrestha (2017) examined the impact of capital adequacy and bank operating efficiency on the financial performance of Nepalese commercial banks for the period 2005 to 2013, using the published annual reports of 17 banks. The study used ROA and ROE as dependent variables and loan ratio, bank operating efficiency, total deposits, total loans, equity, core capital, risk-based capital and total capital ratios as independent variables. The results indicated that total deposits to total assets and bank operating efficiency are considered to be major determinants of the financial performance of commercial banks in Nepal.

The bank operating efficiency, loan ratio, total deposits to total assets, loan loss, and provision to total equities have a significant positive impact on the financial performance of commercial banks. On the other hand, the loan loss provision to total loans, core capital ratio, risk-weighted ratio and total capital ratio hurt financial performance in Nepalese commercial banks.

Sadien (2017) analysed the impact of the change from Basel II to Basel III on the profitability of the South African banking sector for the period 2012 and 2013. Basel III came into operation on 1 January 2013, and focuses on capital regulatory requirements and liquidity requirements. Sadien's study used ROA, ROE and NIM as measurements, and examined the five largest banks in South Africa according to market capitalisation. These banks made up 91.1% of bank assets as of December 2012. The results of the study revealed that there is a positive relationship between Basel III and profitability in South African banks, and that banks in South Africa seem to be well capitalised and thus comply with the minimum regulatory requirements.

Nyoka (2017) examined the relationship between bank capital and bank profitability for 13 commercial banks in South Africa for the period 2006 to 2015. GMM was used for data analysis, and the study used determinants of bank performance for measurements. The results revealed that there is a positive relationship between bank capital and profitability, and between capital adequacy, ROA and ROE.

Kana (2017) examined the determinants of banks profitability in South African banks for the period 2001 to 2013. Their study used internal and external determinants to measure the profitability of the banks. The internal factors, also known as banks variables specific, included capital adequacy, bank size, loans, savings, deposits, fixed deposits, credit risk, net interest income and net interest expenses. The external factors, also known as industry-specific factors, included gross domestic product, growth, inflation and lending interest. The results revealed that South African banks are profitable, and both internal and external factors affect their profitability.

The results reported by, Okoye *et al.* (2017), Pradhan and Shrestha (2017), Sadien (2017), Kana (2017) and Nyoka (2017), Almazari (2013) were consistent with the view that there is a significant positive relationship between capital adequacy and bank performance. The above findings were different from those of Sulaiman and Mohammed (2014), who found an insignificant negative relationship between capital adequacy and bank performance. Okafor *et al.* (2011) found neutral results, for example, banks that keep adequate capital on hand are not guaranteed of a good performance.

The study further indicated that there is a direct linkage between capital adequacy and bank performance in the long run. Rime (2001) pointed out that noncompliance with the minimum capital adequacy requirements leads to poor performance of a bank; however, scholars like Allen, Carletti and Marquez (2011) argued that banks that hold capital above minimum regulatory requirements do not necessarily enjoy a good financial performance. These scholars found a negative deterministic relationship between capital adequacy and bank performance.

The overall empirical results are broadly in line with the theoretical predictions of the buffer theory of capital adequacy, and correspond with the findings of other studies on the relationship between capital adequacy, determinants of bank profitability and bank performance. Nonetheless, regulatory requirements provided a large amount of insight on the relationship between capital adequacy, determinants of bank profitability and bank performance. Most of the previous studies focused on bank-specific variables and industry-specific variables in the context of capital adequacy and bank performance, which is why this study focused on both bank-specific and industry-specific variables, as well as bank liquidity in the context of net stable funding ratios and liquidity ratios. This study further distinguished between the time during and after financial crises, as recommended by Luvuno (2018) who investigated the determinants of commercial banks' liquidity in South Africa.

3.1 EMPIRICAL STUDIES ON OTHER FACTORS THAT AFFECT BANK PERFORMANCE

A number of factors affect bank performance, for example. liquidity, size of the bank, corporate governance, capital structure and market power. The abovementioned factors are discussed below in detail.

3.3.1 Liquidity and bank performance

Bourke (1989) conducted a study on the determinants of bank profitability in Europe, North America, Australia, and Europe by examining the internal and external determinants of profitability using the relationship between liquidity ratio and return on assets. The results revealed that there is a significant positive relationship between liquidity ratio and return on assets.

Sulieman Alshatti (2014) investigated the effect of liquidity management on profitability in Jordanian commercial banks for the period 2005 to 2012. A sample of 13 banks was used to represent the population of commercial banks. The study used the following variables: investment ratio, quick ratio, capital ratio, net credit facilities or total assets, and liquidity assets ratio, while return on equities and return on assets of available funds were used as proxies for profitability. The results showed that there is a positive effect on liquidity management, the quick ratio and investment ratio, but a negative effect of capital ratio and liquid assets on profitability. The following recommendation was suggested: there is a need for the utilisation of available liquidity in various aspects of investment to maximise profitability.

Repullo (2004) argued that the use of available liquidity in various investments, for example, an increase in capital requirements, reduces risk-shifting incentives but lowers bank profits. For this reason, the cost of increasing capital regulation is fully transferred from the depositors, which reduces profits. Banks thus need to adopt a general framework of liquidity management to ensure that there is sufficient liquidity for their operations, as well as the ability to achieve a balance between sources and the use of funds (Sulieman Alshatti, 2014).

Chen *et al.* (2017) investigated the causes of liquidity risk by evaluating the relationship between bank liquidity risk and bank performance using an unbalanced panel database set of 12 advanced economies' commercial banks for the period 1994 to 2006, namely: Australia, Canada, France, Germany, Italy, Japan, Luxembourg, Netherlands, Switzerland, Taiwan, the United Kingdom and the United States. The study used a panel data regression model and employed the two-stage least square variable to estimate bank liquidity and performance model used by each country. The results revealed that two of the causes of liquidity risk is liquid assets and the dependence of a country on external funding, supervision, regulatory requirements and macroeconomic factors. Lastly, liquidity risk lowers a bank's profitability, which is measured by return on assets and return on equities, due to a higher cost of funds, but increases the bank's net interest margins (NIM). Banks with a lack of stable funding use liquid assets or rely on external funding to meet the demands of the funds; thus, this increases a bank's cost funding. The banks that possess a high level of illiquid assets in loans are likely to receive higher interest income. Liquidity risk affects bank performance.

Le (2017) examined the relationship between the non-interest income and net interest margins of Vietnamese banks from 2006 to 2015. A sample of 40 domestic commercial banks, and joint venture banks was selected, and data were analysed using a regression model. The estimation of the results indicated that there is a negative but statistically significant relationship between non-interest income and net interest margins.

Marozva (2015) analysed the relationship between liquidity and bank performance in South African banks from 1998 to 2014. The study used autoregressive distributed lag, the bound testing approach and the ordinary least square to examine the link between net interest margins and liquidity. Marozva viewed liquidity in the context of market liquidity and funding liquidity risk, and found a negative relationship between net interest margins and funding liquidity risk. There was an insignificant relationship between net interest margin, market liquidity risk and funding risk. Further research was recommended to investigate liquidity in the context of assets and liability mismatches.

Based on the above recommendations, Marozva (2017) conducted a study to investigate further the link between liquidity in the context of assets and liabilities mismatch and profitability using 12 South African banks for the period covering 2005 to 2015 using the GMM. The study used two forms of measurement – the Aggregate Liquidity Mismatch Index (ALMI) and the Bank Liquidity Mismatch Index (BLMI) compared to Basel III measurement and traditional liquidity measurements. The results indicated that the ALMI gives a better prudential liquidity measure that can be used in dynamic stochastic general equilibrium models, unlike the BLMI which can be used to evaluate the liquidity of a given bank under stress events.

Luvuno (2018) examined the determinants of commercial banks in South Africa by investigating the relationship between bank liquidity and bank performance, and applying GMM for 12 banks covering the period 2006 to 2016. The results indicated that capital adequacy, size and GDP have a significant positive effect on liquidity, whereas there is a negative and significant effect between loan growth, non-performing loans and liquidity. Lastly, inflation has both a negative and positive effect on liquidity.

Charmier *et al.* (2018) examined the impact of liquidity on the performance of commercial banks in Ghana using a sample from 2007 to 2016. Descriptive Statistics was used to analyse data, and the study used the ratio of liquid assets to total assets, and the ratio of liquid funds to total assets as measurements. The specific control variables were as follows: net interest margin, bank size, capital adequacy, foreign ownership and profitability. The results were as follows: the average liquidity assets to total assets were 20%, while liquidity cover over total interest-bearing liabilities was 1.19%. Another result showed that there was a positive relationship between liquidity and ROA using both measures, but an insignificant negative relationship between liquidity and ROE, and liquidity assets to total interest-bearing liability. With regard to the control variables, there was a positive relationship between net interest margin, bank size, capital adequacy, foreign ownership and profitability. A recommendation was made that banks must determine the level of liquidity beyond which their profitability will be reduced.

Pradhan and Shrestha (2016) examined the effect of liquidity on the performance of commercial banks in Nepal for the period from 2005 to 2014. The study used investment ratio, liquidity ratio, capital ratio and quick ratio as independent variables, and ROE and ROA as dependent variables. The study used a regression model to analyse the data from 16 commercial banks to analyse the impact of liquidity on bank performance. The study revealed a positive relationship between capital ratio and ROE and also indicated that the higher the capital ratio, the higher the ROE. However, the relationship between ROE and liquidity ratio was found to be negative, indicating that higher liquidity in a bank lowers ROE.

Furthermore, there was a negative relationship between quick ratios and ROE. The investment ratio and capital adequacy were positively significantly related to bank performance, which implies that an increase in investment ratio and capital ratio also leads to an increase in bank performance. There was, however, a negative relationship between liquidity ratios and quick ratios, with ROA and ROE indicating increased liquidity ratios, and quick ratios decreasing the ROA and ROE of the banks.

In the context of Nepal, Karki (2004) found that liquidity ratios were relatively unstable over the period; however, ROE was found to be acceptable and indicated a positive relationship between deposits and loan advances.

Joshi (2004) analysed financial performance through the use of internal and external determinants of bank performance to show the cause of change in the cash position of two banks. In the study, profitability was used to measure ROA, ROE and net interest margins, with the results indicating that liquidity and bank loans are positively related to bank performance.

Pradhan and Shrestha (2016) noted that few studies have been conducted on the determinants of profitability of Nepal commercial banks. Joshi (2004), Karki (2004), and Maharjan (2007) also found a positive relationship between capital adequacy, profitability, liquidity and bank performance.

Ngure (2014) investigated the relationship between interest rates and bank performance of commercial banks in Kenya. A descriptive research design was used to obtain data from the Central Bank of Kenya for the period from 2009 to 2013. The data were analysed using SPSS version 21, and the study found that interest rates have a significant positive effect on bank performance. The relationship between interest rates and bank performance was also found to be linear, with an increase in interest rates leading to higher profitability.

Iftikhar (2015) investigated the relationship between financial reforms, financial liberalisation, bank regulation and banking supervision with NIM. The study employed two-step GMM for data analysis for the period from 2001 to 2005, and the bank scope database was used for more than 1,300 banks from developed and developing economies. The empirical results indicated that financial reforms and financial liberalisation have a significant negative relationship on interest margins.

Kumar, Stauvermann, Patel and Prasad (2016) examined the determinants of non-performing loans (NPL) in the banking sectors of Fuji Their study was conducted on the Fuji banking sector, which consists of five commercial banks and two non-commercial banks, for the period from 2000 to 2013. The data were analysed using descriptive statistics and a correlation matrix, and took into account the following macroeconomic factors: economic growth, inflation, changes in real effective exchange rate, unemployment and external factors. The results indicated a statistically significant relationship between NPL and ROE, CAR requirements. On the other hand, NIM has a significant positive relationship with NPL.

Dhar and Bakshi (2015) examined the factors that influenced the variability of non-performing loans of Indian banks in the public sector from 2001 to 2005. Panel data regression was used to analyse the data of 27 public banks in India. The findings revealed that NIM and CAR exhibit an insignificant negative relationship with NPL.

Different methods were used to measure the relationship between liquidity and bank performance by different scholars, some researchers used bank-specific variables such as ROA, ROE, NIM liquidity ratios and other bank performance ratios, industry-specific variables such as unemployment, inflation.

Varying results from different researchers are captured above. Charmier *et al.* (2018), Karki (2004) and Bourke (1989), found a positive relationship between liquidity ratio and ROA, whereas Pradhan and Shrestha (2016) found a negative relationship between liquidity and ROA. The reason for these inconsistent results could be that higher liquidity lowers ROA. Sulieman Alshatti (2014) and Charmier *et al.* (2018) found consistent positive results between quick ratios, investment ratios, ROE and bank performance. Luvuno (2018), Karki (2004), Joshi (2004), Maharjan (2007), meanwhile, found a positive relationship between capital adequacy, profitability and bank performance. Charmier (2018) and Pradhan and Shrestha (2016) found a negative result between ROE and liquidity, quick ratio and ROE, and liquidity ratio and ROE, which highlights that higher liquidity hurts bank performance.

A Majority of the studies above indicated that there is a linkage between liquidity and bank performance, which corresponds to findings obtained by other studies on the determinants of bank performance worldwide. Previous studies focused more on ROA and ROE as bank-specific variables. However, this study focused on ROE, ROA, NIM and capital adequacy.

Basel III sets out the regulations that banks need to follow to maintain a minimum capital adequacy ratio in order to resolve their liquidity requirements. These minimum requirements assist banks to recover as quickly as possible should there be any financial crisis.

3.3.2 Size and bank performance

Aladwan (2015) examined the impact of bank size on profitability for Jordanian listed commercial banks for the period during and after the 2007-2009 financial crisis.

The study employed ROE as a dependent variable which was used to measure profitability, and banks were classified according to their total asset size.

The results showed a significant variation in the profitability of these different sizes of banks; firstly, profitability increases as the bank size decreases, while the bank size increases as the profitability decreases. In a nutshell, the size of the bank affects profitability. The conclusion reached was that small and medium banks are likely to be more profitable than large banks.

Jara-Bertin, Moya and Parales (2014) analysed the impact of industry-specific variables and bank-specific variables to measure the size and performance of Latin American banks covering the period 1995 to 2010. A sample of over 78 commercial banks in Argentina, Brazil, Chile, Colombia, Mexico, Paraguay, Peru and Venezuela was used. The data were analysed using the panel data estimator version of the GMM. The results indicated that there is a positive relationship between bank performance and bank-specific variables, namely size, capital ratio and specialisation degree; and performance and industry-specific variables, namely, economic growth, inflation and bank concentration. There was a negative relationship between bank performance and industry-specific variables, namely credit risk, liquidity and operational inefficiencies.

Terreza (2015) investigated the effect of size on bank performance by empirically analysing 1,270 European banks for the period 2005 to 2012. The study employed capital and liquidity as variables, and the data were analysed using panel data which were split into three sections: large, medium and small banks. The purpose of this split was to compare European banks according to their sizes. The first result showed homogeneity in the behaviour of large banks. With the other samples, to account for performance, a dynamic panel model was applied using a GMM. The estimation results showed a significant positive relationship between performance and medium banks, and a positive relationship between liquidity and bank performance. Lastly, there was no relationship between greater efficiency and bank performance, while capitalisation level increases bank performance, liquidity risk depends on the size of the bank. The capital has a positive effect on bank performance; however, it affects liquidity ratios.

Singh and Sharma (2016) conducted an empirical analysis of industry-specific and bank-specific variables affecting the liquidity of Indian banks from 2000 to 2013. The study analysed 59 banks. The industry-specific variables used were GDP, inflation and unemployment rate, whereas the bank-specific variables used were bank size, performance, cost of funding, capital adequacy and deposits. A liquidity trend analysis was performed based on ownership, with the study revealing that bank ownership affects the liquidity of banks. The following bank-specific variables, namely bank size, deposits, performance and capital adequacy, positively affect liquidity, except the cost of funding. Lastly, bank size and GDP hurt bank liquidity, whereas deposits, performance, capital adequacy and inflation have a positive impact on bank liquidity except for unemployment.

Alex and Ngaba (2018) examined the effect of bank size on the financial performance of 42 registered commercial banks for the period 2012 to 2016 in Kenya. The banks were categorised into three groups – large, medium and small. Multiple linear regression methods were used to analyse the data. The results revealed that the large medium banks have higher ROAs than small banks. Large banks are likely to perform better compared to small and medium banks, hence their better profitability. Therefore, the study found a positive relationship between size and the performance of the banks in Kenya.

Westhuizen and Oberholzer (2003) assessed the relationship between different performance measures and the size of South African banks from 1997 to 2000. A data envelope analysis was employed to analyse the data. The study found that there was a positive relationship between some of the performance measures and the size of the bank, and a positive relationship between the size of the bank and bank performance measures.

Ali and Pauh (2018) examined the internal determinants of bank profitability and stability in Pakistan for 24 commercial banks from 2007 to 2015. The purpose of the study was to assess the role of the banks' internal determinants when it comes to attaining high performance. A separate analysis was compared between profitability perspective model and stability perspective model using the panel regression method.

The results from the profitability perspective model revealed that there is a positive relationship between bank size, credit risk, funding risk and stability and profitability. On the other hand, there is a negative relationship between liquidity risk and profitability.

From the stability perspective model, there is a positive relationship between bank size, liquidity risk, funding risk and stability, while there is a negative relationship between credit risk and stability. Rasid (2017) examined the main determinants of the 29 Islamic banks in the Gulf Corporation Council from 2005 to 2012. Data were analysed using GMM, and the study found that bank-specific factors, namely equity financing and bank size, positively affect profitability. The next section discusses empirical studies on corporate governance and bank performance.

3.3.3 Corporate governance and bank performance

Peni and Vahamma (2012) examined the effects that corporate governance had on American commercial banks' performance during the financial crisis of 2007 to 2009. The study examined whether banks with good governance mechanism practices were linked to higher profitability and better stock market performance during the financial crisis. A sample of 62 commercial banks from the United States was used, and data were analysed using a regression analysis model. The study reported mixed findings. Firstly, the research found that banks with good governance mechanism practices were linked to higher profitability in 2008, for example, their governance practices may have mitigated some of the adverse effects of the financial crisis. The second result was that good governance practices might negatively affect stock market valuations of a bank during a financial crisis. Lastly, a bank with good governance mechanism practices is likely to have after substantial higher stock returns in the aftermath.

Malik and Makhdoom (2016) analysed whether corporate governance has an impact on the financial performance of Fortune 500 organisations in non-USA and the USA countries, using Chief Executive Officer (CEO) incentive, CEO duality, board independence, and frequency of board meetings as variables. The period of the study was from 2005 to 2012, covering the time pre and post the financial crisis. The findings showed a significant positive influence of corporate governance on financial performance.

In addition, organisations with smaller boards are found to generate better financial performances, and the frequency of board meetings and CEO incentives also have a positive impact on organisational performance.

Bukair and Rahman (2015) examined the relationship between board structure, investment account holders and bank performance in the Islamic banking industry. The research sampled data from 40 Islamic banks operating under the Gulf Corporation Council from 2008 to 2011. The variables used were bank size, leverage, capital and GDP. The results indicated that both the size and board composition have a negative relationship on bank performance. On the other hand, the separation of CEO and chairman roles have no relationship on bank performance, while the there is a positive relationship between the independence of the chairman and bank performance; however, GDP had no significant impact on bank performance.

Mohammed (2012) investigated the impact of corporate governance on nine Nigerian commercial banks for the period 2001 to 2010. Regression analysis was employed for analysis purposes, and the study revealed that corporate governance affects bank performance in Nigeria. The study also conclusively indicated that poor asset quality and loan deposit ratios affect bank performance negatively.

Islam, Sathye and Hu (2015) examined the relationship between comprehensive measures of corporate governance and bank performance in Bangladeshi banks from 2002 to 2006. A sample of 30 banks was used, and regression analysis was employed to analyse the data. The study used ROA to measure bank performance and a corporate governance compliance score sheet to measure bank compliance. The results found that since the introduction of a Code of Corporate Governance in Bangladesh, banks had significantly improved their banking practices.

Makhusha and Nhavira (2017) examined the relationship between corporate governance and the performance of five indigenous commercial banks in Zimbabwe from 2010 to 2016. The corporate governance control mechanisms for the study were board size, independence of directors, equity ownership by investors, employees or executives.

The study adopted Basel II-IV for banking and supervision, and the King II-IV code of corporate governance. The study found similar results to the study conducted in Kenya by Wepukhulu (2016) and Mambondiani, Zhang and Arun (2012), there was a positive effect between the independence of the board and bank performance measured by ROE and ROA, and there was no relationship between board size and bank performance which was measured by ROE. On the other hand, there was a positive relationship between board independence, individual ownership and bank performance. Finally, there was a positive relationship between executive ownership and bank performance.

Fanta, Kemal and Waka (2013) examined the corporate governance mechanism and their impact on the performance of commercial banks in Ethiopia from 2005 to 2011. The study measured corporate governance using the internal and external mechanisms of corporate governance and bank performance measured by ROA and ROE. The results indicated that board size and capital adequacy ratio positively affect bank performance. In addition, the following have a positive impact on corporate governance and bank performance: government intervention, inadequate governance practices, absence of a national standard of corporate governance, accounting, auditing and weak legal framework.

Tizazu (2017) examined the relationship between corporate governance and financial performance in the Ethiopian non-financial industries for the period 2009 to 2013. Data were collected from 42 organisations in Ethiopia and analysed using the panel data regression method. The results showed that there is a positive relationship between corporate governance and financial performance, which is mostly influenced when there are big agency problems. Another result indicated that high-risk organisations such as banks adhere to good governance practices. The study identified organisational growth, level of risk-taking by an organisation and shareholders as a good indicator for the relationship between corporate governance and financial performance. Peni and Vahamma (2012) noted that the positive relationship between corporate governance and financial performance serves as an indication that corporate governance needs carious attention within an organisation.

Malik and Makhdoom (2016) identified the frameworks of corporate governance and their enforcement, additional corporate standards strong financial markets as a tool that can be used to minimise financial crises.

Mashonganyika (2015) explored the impact of corporate governance reforms on organisational performance for companies listed on the Johannesburg Stock Exchange from 2009 to 2013.

A sample of 99 organisations was used, and a panel data regression model was employed for data analysis purposes. The study used King III to measure the corporate governance mechanism and ROA and ROE to measure performance. The results revealed that corporate governance and board size do not affect organisational performance.

Tshipa (2017) examined the relationship between corporate governance and organisational performance for South African organisations, covering the period from 2002 to 2014. The study used board size, board independence, board committee, board diversity and leadership structure as independent variables, and ROA and a market-based measure (Tobin's Q) as dependent variables. The study used a sample of 90 organisations that were listed on the Johannesburg Stock Exchange, which were selected from the five largest South African industries, including the financial industry. Two methods of data analysis were employed, namely GMM and generalised least square. The study found that organisations apply corporate governance differently during financial crises and post-financial crises. In some organisations, the application of corporate governance positively influences organisational performance during and post-financial crises. Another result revealed that the market perceives larger boards, board activities, board committees and leadership structures to provide adequate monitoring and reduce agency costs. The next section discusses capital structure and bank performance.

3.3.4 Capital structure and bank performance

De Wet (2013) analysed the determinants of the capital structure of banks in South Africa and bank performance from 1994 to 2010.

The study employed panel data to analyse data from the four largest commercial banks listed on the Johannesburg Stock Exchange – Absa, FirstRand, SBSA and Nedbank. The study measured performance using ROA, ROE and earnings per share, and used price-earnings ratio and market to book value to measure capital.

The results showed that capital structure does not influence profitability and market value positivity and does not necessarily influence banks' financial distress. The results thus failed to align the with capital structure theory conclusively.

Duasa, Zain and Al-Kayad (2014) examined the effects of capital structure on Islamic banks from 2003 to 2008. A sample of 85 Islamic banks was employed over 19 countries and data were analysed using two least square model Performance was measured using ROE, ROA and NIM and capital over total assets over book value of assets and loan to asset ratio. The results indicated that there is a relationship between capital structure and bank performance. The conclusion was made that capital structure influences bank performance.

Studies by Dawar (2014) investigated the impact of capital structure's choice on organisational performance in India as an emerging economy from 2003 to 2012. The following variables were used: size, age, tangibility, growth, leverage, liquidity and advertising. The findings were that leverage does not have an influence on financial performance in organisations in India, which is in contrast with the assumptions of agency theory, which are commonly accepted in other developed as well as in emerging economies.

Nikoo (2015) examined the impact of capital structure and bank performance for 12 commercial banks in Jordan covering the period 2007 to 2011. The study employed panel regression to analyse data of the 12 commercial banks that were listed on the Amman Stock Exchange. Performance was measured by; namely, net profit, return on capital employed, ROE and net interest margin and to capital, structure variables were a total debt to funds and total debt-equity.

The results indicated that performance, which was measured by net profit, return on capital employed and net interest margin, is positively associated with total debt, whereas debt was insignificant in determining ROE in the banking industry of Jordan.

Anarfo (2015) examined the relationship between capital structure and the bank performance of Sub-Saharan African banks for the period 2000 to 2006. The following variables were used to measure performance: ROA, ROE and net interest margin, and capital structure was measured by total debt ratio. The study employed a sample of 37 countries, and data were analysed using the statistical software package (SSP) model. The results indicate that capital structure does not determine bank performance; however, bank performance determines capital structure. Nikoo (2015) investigated the relationship between capital structure and bank performance in 18 banks listed on the Tehran Stock Exchange from 2009 to 2014. The study used ROA, ROE and earnings per share to measure the effect of capital structure on bank performance. The study determined that there is a positive relationship between capital structure and bank performance by using SSP to analyse the data.

Marandu and Sibindi (2016) examined the relationship between capital structure-specific determinants and the profitability of South African banks for 12 years from 2002 to 2013. The bank-specific determinants were capital adequacy, size, business risk, growth rate and tax on banks. The study employed panel regression to analyse data for six major banks, Absa, Nedbank, FirstRand, Standard Bank, Capitec Bank and African Bank. Profitability was measured using ROA and ROE, and capital was measured using deposits, credit risk, and interest rates. The results showed a significant relationship between profitability measured by ROA, and the determinants of capital structure which was measured by capital adequacy, size, deposit and credit risk.

On the other hand, the relationship between ROA, deposits as well as credit risk, seem to be sensitive to the business risk. The study also found no relationship between capital structure and ROE. The study revealed that the composition of debt-equity equity in South African banks is higher.

Maduane and Tsaurai (2016) investigated the link between capital structure and profitability in the South African banks listed on the Johannesburg Stock Exchange for the period 2010 to 2014. Panel regression analysis was used to analyse data for these banks. The measurement variables for performance were ROA and ROA, and for the capital structure, they were short term debt to total assets, long term debts to total assets, and total debt to total assets.

The results showed that capital structure is a key determinant of the profitability of banks in South Africa, and there is a positive relationship between the two.

The study also found that there is a positive relationship between capital structure and profitability in the banking sector in South Africa, particularly higher equity and low debt-equity. The study recommended that policymakers need to persuade banks to use finance equity as opposed to debt-equity to ensure the sound performance of the bank.

Olajide, Funmi and Olayemi (2017) examined the relationship between capital structure and bank performance in Nigeria and Sub-Saharan Africa from 1996 to 2014. The study employed GMM to analyse data obtained from the Nigerian Stock Exchange, and used ROA, ROE and earnings per share to measure bank performance and debt ratio to measure the capital structure. The study found positive and negative results in Nigeria and other African countries, including a negative relationship between capital structure and bank performance in Nigeria. The study concluded that African banks have relatively high agency costs, which leads to the negative performance of banks in Nigeria and also mixed results in other African countries.

Musah (2018) examined the effects of capital structure on the profitability of banks in Ghana from 2010 to 2015. A sample of 23 banks was employed, and the study used short term debt ratios and long-term ratios to measure the capital structure, and ROA and ROEA to measure profitability. The results indicated that banks in Ghana are highly leveraged, with debt financing making up approximately 84% of capital, of which 77% is based on the short-term debt, regardless of the increase of minimum capital equity of these selected banks.

Another result revealed that short term and long-term debt ratios have negative relationships with profitability, whereas there was a positive relationship between total debt and profitability. Finally, the results indicated that banks in Ghana are heavily reliant on short term financing, and deposits reduce the profitability of the bank. Banks in Ghana should shift their financing from deposits to other sources. Banks must choose a mix of short and long-term financing debt to maximise profitability.

Serwadda (2019) investigated the effects of capital structure on bank performance in Uganda for ten years from 2006 to 2015. A sample of 20 commercial banks was used, and four variables measured for performance: ROE, ROA, net interest margin and cost to income ratio.

Long term debt to total assets, short term debt to total assets and total debt ratio were used to measure capital structure. Finally, the study used panel regression to analyse the data. The study found a positive relationship between capital structure variables and bank performance, and between long term debts, total debts and interest margins. The study also found a positive relationship between total debt and ROA, and between total debt and ROE. However, there was a negative relationship between short term debt and ROA. This implies that profitable banks rely heavily on debt financing as their financing option for business operations. This was advanced by the fact that roughly 68% of total assets were represented by short term debts. Recommendations by the study; the executive management of the bank teams and policymakers design and implement prudent financing decisions aimed at reducing over-reliance on debt financing, as opposed to equity financing or capital structure levels.

Anyaogu, Ezirim and Ezirim (2018) examined the impact of capital structure and bank performance in Nigeria from 1985 to 2013. The GMM was used to analyse 13 listed banks selected from the Nigerian Stock Exchange. The study measured capital structure with debt and equity finances, and performance with return on investment. The findings were that there is a long-term relationship between capital structure and bank performance. Debt and equity finance and leverage positively influence returns on investments for both the short and long term.

The results further indicated a significant negative relationship between leverage and bank performance. Equity was affected by performance significantly, while the debt effect was not significant. The conclusion can thus be made that Nigerian banks would perform better when using equity finance as opposed to debt financing in capital structuring to boost their returns on investment.

The above results are consistent with the capital structure theory, which argues that banks should have a better performance than those who do not put into practice capital structure theory, which is triggers this information through higher capital ratio except for results by de Wet (2013).

The agency theory aims to clarify the organisational capital structure in an attempt to minimise the costs associated with the separation of ownership and control.

Serwadda (2019), Anyaogu *et al.* (2018), Musah (2018), Maduane and Tsaurai (2016), Marandu and Sibindi (2016), Nikoo (2015) and Duasa *et al*. (2014) found a positive correlation between capital structure and bank performance. Yet, some scholars have observed a negative relationship, including De Wet (2013). Anarfo (2015) found no connection between the two, while Olajide *et al.* (2017) and Anarfo (2015) observed both a positive and negative impact on bank performance. There could be several reasons for there being both a positive and negative relationship; for example, the researchers may have used a different analysis model to others who found positive results. For example, Anarfo (2015) used SSP, whereas Olajide *et al.* (2017) used GMM, and their study was conducted in African countries.

The current study examined the effects of capital structure on South African banks by employing both dependent and independent variables. By following performance proxies ROA, ROE and net interest margin and capital adequacy. These proxies were chosen because they have been applied previously by empirical studies as determinants. The next section discusses bank regulation and bank performance.

3.3.5 Market power and bank performance

Hamza and Kachtouli (2014) examined the competitive conditions and market power of the conventional and Islamic banks in MENA and Southeast Asia from 2004 to 2009. Their study used the following measurements: the (HHI), H static Panzar-Rosse and the Lerner Index models, which are based on econometric estimations that evaluate the structure of the market and measure its power in terms of its price setting.

The panel regression method was used to analyse the data of 62 Islamic banks and 128 conventional banks operating in 18 countries. The study used both a structured and non-structured approach. The results indicated that under the HHI, both markets are low concentrated competition and market power, while according to concentration ratios, the Islamic market is considered to be moderately concentrated. The H static Panzar-Rosses is related to the degree of competition, while the Lerner Index of market power showed that both markets are characterised by monopolistic competition. Islamic banks expressed a high degree of market power.

In a competitive environment, normally individual banks analyse the structure of their market and competitive conditions to implement a business strategy and effect action plans. The Islamic banks in the MENA and Southeast Asia have enhanced their competitiveness by offering new products, which is considered as a determinant for their success.

Garza-Garcia (2012) examined whether market power influenced the profits in the Mexican banking sector for the period 2001 to 2009. Market power was measured by Structure Conduct Performance and Relative Market Power (SCP) Relative Market Power (RMP). An unbalanced panel regression was used to analyse the data. The results thus indicate that bank profits are determined by good market share, confirming relative market power. The findings also show that profits persist over time and adjust slowly to the average level, meaning that the banking sector is not strongly competitive. However, there was no positive relationship between greater efficiency and bank profits. Lastly, while the capitalisation level increases bank profit, liquidity risk decreases them.

Cupian and Abduh (2017) examined the competitive conditions and market power of Islamic banks in Indonesia from 2006 to 2013 using structured and non-structured measures related to the traditional approach and industry organisation. The study used the Herfindahl-Hirschman Index to ascertain the competitiveness level, while the H static Panzar- Rosse and Lerner Index was used to examine market power and analyse the data of 27 banks in Indonesia.

H static Panzar- Rose was used to test the profitability of banks, with the results revealing that banks with a higher degree of market power lead to a less competitive market. Other studies indicated that Islamic banks earn their revenues under monopolistic competition, yet banks that were operating in a monopolistic environment were less efficient during the period of the study. Lastly, those banks that operated under a monopolistic environment were not able to achieve high records of profitability.

Wang, Zeng and Zhang (2014) examined the relationship between market power and the efficiency of 21 Chinese commercial banks from 2000 to 2009. The Lerner Index and Z-Index were used to measure market power and stability.

These banks included four state-owned banks and 17 joint-stock and city commercial banks in Hong Kong and the mainland. The results were that the relationship between market power and bank efficiency in Hong Kong and the mainland are inconsistent with the traditional efficient structure; banks with higher market power are dependent on their monopoly position and have no strategy to improve bank efficiency. The four state-owned commercial banks had strong market power and relatively low bank efficiency.

Sanderson and Pierre (2016) examined the relationship between banking competition and efficiency in Zimbabwe for the period covering 2009 to 2014. Competition was approximated using the Lerner Index, and efficiency and data envelope was used for analysis. The findings showed that the banking sector operates under monopolistic competition, and there was a positive relationship between cost efficiency and market power and competition. They further confirmed that banks pose some market power in pricing their products, because banks sell products that are different in terms of advertising and branding, among other products.

Market power was determined by capital adequacy, non-performing loans, liquidity risk, cost-income ratio and regulatory incentives. The intervention of policymakers and the government is needed to put measures in place that increase economic activity in the country, because an increase in economic growth will increase the demand for banking products.

Lastly, the study found that the memorandum of Understanding (MoU) between the banking sector and the regulators that was introduced by the government reduces the market power of the banks as it defines the pricing formula for banking products, for example, they are overcharging customers in bank charges and interest rates.

Different methods were used to measure market power and bank performance by different scholars, structured vs. non-structured approaches, and variables such as ROA, ROE, capital adequacy, non-performing loans, liquidity ratios and cost to income ratios. Varying results were also found by different researchers.

3.6 SUMMARY CHAPTER

This chapter focused on empirical studies reported in the literature, the theme of the empirical studies listed above reflected different results reached regarding regulations and bank performance. Although different scholars reached diverse results, the more dominant and common results were those that focused on internal determinants, for example, capital adequacy, net interest margin, Basel III, ROA and ROE, as well as external determinants of bank performance, namely inflation, growth and GDP, and their relationship with bank performance. In the majority of the above studies, the scholars used a regression model to analyse the data to determine any relationship, which is why this study used regression analysis and capital adequacy, net interest margin, ROE and ROA as measurements.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter describes the research methodology and the research approach adopted for this study. These give direction to a researcher when planning and implementing a study in order to achieve the intended outcomes (Bradley, 2007). Ndou (2016) and Cormack (2000) defined research methodology as the method that is followed by a set of procedures applicable for a particular study. According to Burns and Grove (2003), the research methodology comprises the entire strategy of study, from the identification and assessment of the problem, to the final phase of data analysis, conclusion and recommendations. Leedy and Ormrod (2015) noted that there are two approaches to research methodology, namely qualitative research and quantitative research. These have some similarities; for instance, they both entail identifying a research problem, reviewing related literature, and collecting and analysing data. Both approaches also have specific characteristics. Quantitative research involves the use of numerical data, it is represented by a large sample, and statistical analysis is used, while for qualitative research, textual data is used, it is informative, and a small sample is used (Saunders, Lewis & Thornhill, 2016; Leedy & Ormrod, 2015; Yin, 2014).

For this study, a quantitative approach was used, with the secondary data being numerical in nature. Kana (2017) emphasised that quantitative research is the type of research which applies empirical analysis and empirical statements. These empirical statements are expressed in numerical terms, and their explanations take into account empirical analysis.

They describe what the case is in the real world rather than what the case should be. This chapter also deals with the research design, research methods and regression analysis used in the study.

4.2 RESEARCH DESIGN AND PARADIGM

According to Saunders, Lewis and Thornhill (2007), research design is essential for any study to answer the research questions and achieve the study’s objectives.

Cooper and Schindler (2008) defined research design as the plan and framework of an investigation developed to obtain answers to the research question, while Saunders *et al.* (2016) defined research design as the framework that links the philosophical paradigms and the methodological assumptions of a research approach. A quantitative research design was used in this research to investigate the nexus between bank performance and independent variables. According to Msweli (2019), quantitative research is described as a systematic way of collecting primary data from a large population, sample some information out of these data, and generalise them to a broader population. Msweli (2019) added that, in the field of social science, the traditional approach of positivism is not materially different from that in the natural sciences.

The positivist research paradigm refers to researchers who maintain objectivity in their judgement and explanation of social research. The researcher's view is not linked to the problem being studied, but explains the findings, based on empirical evidence and tested theories using quantitative research methods. These findings are considered to be objective and generalisable (Saunders *et al.,* 2016). For this study, the deductive approach was followed.

The deductive approach involves the testing of theoretical propositions about the relationship between two or more variables (Mutezo, 2015). As the objective of this study was to investigate the impact of regulatory requirements on bank performance, the deductive reasoning approach applied, which uses existing literature to analyse data by converting theory to data.

Deductive reasoning uses generalisability from general statement and examines the probabilities to reach a specific logical conclusion, verifies theories, and uses propositions or existing theory for data collection (Saunders *et al*., 2016). The theories related to a study help to generalise the findings that can be relevant to other populations.

In this study, the data used included locally registered banks in terms of the Banks Act 94 of 1990 for the period 2009 to 2019 and liquidity ratios. These ratios were derived s from the SARB (BA900) as the source of secondary data.

The evaluative design is concerned with assessing the relationship between two or more variables. In this study, evaluative design was used to analyse the relationship between bank performance and regulatory requirements for South African banks, that were registered in South Africa for the period 2009 to 2019, and this were done by assessing how these banks were complying or implementing regulatory requirements in comparison with the existing theories (Saunders, Lewis & Thornhill, 2016:176). This study relied on secondary data by analysing existing data (Leedy & Ormrod, 2016). Leedy and Ormrod (2010) explain secondary data as data collected earlier for other purposes. This data were readily available for use and derived from primary data. A literature review of secondary sources was conducted to establish the background to the problem and the context of the study. Secondary data were collected from the SARB's website under See BA900) economic returns.

4.3 QUANTITATIVE RESEARCH APPROACH

The quantitative research approach was employed to achieve the predetermined objectives of this study. The main objective of the study was to determine the impact of bank performance on regulatory requirements in South African registered banks for the period 2009 to 2019. Saunders, Lewis and Thornhill (2012) defined quantitative research as an illustration of numerical data and an interpretation of observations for the purpose of assessing and clarifying the singularities that are reflected by the observations. According to Creswell (2013), quantitative research is research that explains singularities by collecting numerical data and analysing them using mathematically based models. Ryan (2006) noted a number of advantages of the quantitative research approach, it provides estimates of population at large; it provides results which can be condensed to statistics, and it allows for statistical comparison between various groups. In this study, the population was the banking sector and statistics from a ten-year period were used.

The researcher used regression analysis to come to a conclusion regarding the relationship between bank performance and regulatory requirements. This was done by replicating previous empirical studies conducted by other researchers in various countries.

4.3.1 Research objectives

Using a sample of 18 locally registered South African banks for the period 2009 to 2019, in terms of the Banks Act 94 of 1990, the overall objectives of this study were to investigate the relationship between:

a) bank performance and capital adequacy;
b) bank performance and liquidity coverage;
c) bank performance and net stable funding ratio; and
d) bank performance, bank-specific variables and macroeconomic factors.

4.3.2 Population and sampling

Saunders *et al.,* (2016) and Archaya, Prakash and Saxena (2013) defined a population as the number of possible units or elements that are included in a study. If it is not possible to evaluate an entire population due to its large size or a lack of research resources, then a sample of elements needs to be selected and investigated by the researcher. The target population for a study is the group that the researcher would like to speak about in their findings (Kana, 2017).

4.3.3 Population

According to Yin (2014), a population may be individuals or groups of individuals that the study is focusing on. Ndou (2016) and Leedy and Ormrod (2016) defined a population as the larger pool from which sampling elements are drawn and to which findings will be generalised. However, it might not be possible to evaluate the entire population due to its larger size or lack of research resources, and then only selected samples of elements under review can be considered by the researcher.

The population for this study was drawn from South African registered banks in terms of the Banks Act 94 of 1990, and the data were obtained from the SARB. The sample of the study is listed below. The table lists the names of the banks according to their size and total assets.

Table 4.1: South African banks registered in terms of the Banks Act 94 of 1990 as at 31 December 2019 and their rankings

Name of bank	Total assets as at 31 December 2019 (R millions)	Ranking of the bank by total assets
Standard Bank- South Africa Ltd	94 616	1
FirstRand Bank Ltd	80 283	2
Absa Bank Ltd	75 099	3
Nedbank Ltd	67 583	4
African Bank Ltd	1864	5
Merchantile Bank limited	922	6
Sasfin Bank Ltd	898	7
Grindrod Bank limited	897	8
Deutsche Bank AG	846	9
HBZ Bank Limited	372	10
Ithala Soc limited	235	11
Grobank	231	12
Tyme Bank	118	13
GBS Mutual Bank	106	14
Habib Overseas Bank Ltd	104	15
Finbond Mutual Limited	93	16
Small Enterprise Development Agency (SEDA)	22	17

Source: South African Reserve Bank (2019)

4.3.4 Sampling

According to Leedy and Ormrod (2015), a sample is defined as a subset of a population that is selected to represent the entire population. For this study, non-probability sampling was used to select the most appropriate sample. This type of sampling method represents a group of sampling techniques that assists researchers in identifying a unit from a population that they are interested in studying (Saunders *et al.* 2016; Leedy & Ormrod, 2015).

4.3.5 Sample size

The sample size refers to the number of units in the population were the study is based (Yin, 2014). The population for this study was the banking sector, and the sample was comprised of 12 locally registered banks from the period 2009 to 2019. Data on the banking regulatory framework was available from 2009 to 2019, being the latest data available from the SARB. The study was limited to 10 years, which gave a sample size of 120 number of observations. The 12 banks were chosen for the reason that, at the time of this study, together, they accounted for almost 99% of the sector's total assets (SARB, 2019). In addition, they were selected because data were available on the variables for the period under review.

4.4 DATA COLLECTION TOOLS

For this study, only secondary data were collected, which was appropriate for the quantitative research approach.

The data consist of raw data and published summaries, including data for the construction of the banking regulatory framework, audited financial statements, and data from the SARB. Data from audited financial statements were available from 2009 to 2019.

These data were collected from the SARB BA 900 research database, which is accessible from the SARB's website. Data for macroeconomic variable factors, for example, unemployment and interest rates, including other sources which were relevant to this study were used with regards to bank performance.

In the BA 900 research database, data for South African banks were accessible, which were used for the analysis of bank performance and regulatory requirements. Most organisations collect and store a variety of data to support their operations (Saunders, Lewis & Thornhill, 2009:256).

4.5 DATA ANALYSIS TOOLS

The analysis for this study was a panel data regression analysis, which was used to determine whether there is any statistical relationship between bank performance variables, regulatory requirements variables, liquidity variables and risk-taking variables. In order to run regression models, the GMM was used. According to Camero and Trivedip (2009), EViews software is unable to run diagnostic for panel data regression, whereas STATA software can handle both time series and panel data analysis, supports environment forums, and provides access to users' written commands. This makes STATA software one of the best tools to run regression models.

Panel data regression tools were used in the majority of the studies undertaken in this field by the following researchers: Marozva (2017), Taranhike (2017), Makonko (2016), Alam (2013), Barth *et al*. (2013) and Marczyk, Dematteo and Festinger (2005).

4.5.1 Panel data regression analysis

This study uses panel data regression as its operational. In this study, the control variables were regressed on each variable representing bank performance, bank risk-taking, liquidity, and variables representing the bank's regulatory requirements. According to Matthews and Thompson (2014), one of the benefits of using panel data is that it assumes that the banks being investigated are heterogeneous, while cross-sectional and time-series studies do not control for heterogeneity. For this reason, they tend to report biased results (Marozva, 2017). Another benefit of panel data is that it provides more informative data, thus offering more reliability and less collinearity among the variables, a larger degree of freedom and more efficiency (Barth *et al*., 2013).

The study used panel regression techniques to test the relationship between bank-specific variables, industry-specific variables and macro determinants with regards to bank performance. Panel data is a dataset in which the behaviour of organisations is observed across time. These organisations could be states, companies, banks, individuals, or countries (Alam, 2013). Arguably, regression analysis has been an essential tool for empirical research since the mid-1970s (Chmelarova, 2007).

According to Choon, Hooi, Murthi and Shven (2013) there are two several heterogeneous of multicollinearity, namely random effects and fixed effects. These took into account the individual differences when estimating an economic relationship with panel data (Sibindi, 2017). In order to determine whether to use fixed-effects or random-effects model, the Hausemen test in this study was conducted.

Since in this study, the GMM framework was used as the most appropriate estimation technique, the fixed effects were also run for robustness purposes. The idea behind the fixed effects model is that there is one real value for the treatment effect and that all the trials will estimate this one value. The fixed effects framework was used in order to take into account all the individual differences when evaluating an economic relationship with the panel data.

In order to investigate the impact of the regulatory framework on bank performance, there was a need to estimate which variables would proxy the bank's performance and regulatory framework. Barth *et al.* (2013) and Taranhike (2017) developed a model for the banking regulatory framework, which is based on the following pillars: Basel II Accord, capital adequacy and market discipline.

Variables that model bank performance include accounting ratios and scores (Taranhike, 2017), which were previously used by a number of scholars in their studies (Nyoka, 2017; Taranhike, 2017 Makonko, 2016; Alam, 2013). In this study, similar variables and proxies for the banking regulatory framework and the banking performance were used. The empirical model took the form of the panel regression equation, proposed by Raz, Irawan, Tamarind, Indra and Darisman (2014), Gaganis and Pasiouras (2013) and Chortareas, Girardone and Ventouri (2011).

Twelve different equations were estimated for the study, of which nine were for unadjusted bank performance. Measures for ROE, ROA and NIM and the remaining three were for bank performance adjusted for risk, that is, the Z-Score.

4.6 GENERALISED METHOD OF MOMENTS (GMM)

The GMM is defined as a generic method for estimating parameters in a statistical model; it uses moment conditions that are functions of the model parameters and the data, such that their expectation is zero at the parameter's actual value (Blundell & Bond,1998). The GMM is also a dynamic panel data estimator (Zhou, 2009). Panel data are also known as longitudinal data, which are multi-dimensional data involving measurements over time. The GMM is used to control for endogeneity of the lagged dependent variable in a dynamic panel model when there is a correlation between the explanatory variable and the error term in a model (Bond, Hoeffler & Templete, 2001). The GMM is used for omitted variables bias, and also controls for unobserved panel heterogeneity. Lastly, it also controls measurement errors (Arellano & Bond,1991).

Arellano and Bond (1991) proposed different systems of GMM, namely one-step GMM and two-step GMM. Both the different GMM corrects endogeneity by transforming all regressors through difference and removes fixed effects in the process. However, this first difference transformation has a weakness because it subtracts the previous observation from the contemporaneous one, thereby magnifying a gap in an unbalanced panel. Application of GMM estimator yields both a biased and inefficient estimate of ∅ in finite samples, which is particularly acute when *T* is short. According to Blundell and Bond (1998), the poor performance of the different estimator in such circumstances can be attributed to the use of weak instruments. In this case, the system GMM is applicable because it expresses one equation in one level form with first differences as instruments.

The second equation is in a different form with levels as instruments; this approach involves the use of a greater number of moment condition. Still, Monte Carlo evidence simulation suggests that when *T* is short, the dependent variable is persistent, there again in precision, and the small sample is reduced when the system GMM is applied (Blundell & Bond,1998).

Also, in the presence of heteroscedasticity and serial correlation, a two-step system GMM estimator should be used by exploiting a weighting matrix using residuals from the first step. The two-step GMM is regarded as the augmented difference GMM for the following reasons: it requires more robustness than the one-step system GMM, and it is more efficient and robust than heteroscedasticity and autocorrelation (Roodman, 2006). The two-step system GMM requires panel data that may be balanced or unbalanced, and the number of cross-sections is greater than the number of the dimensions *N*>*T*. Lastly, it also generates dummies yearly, and it specifies a dynamic model.

However, in finite samples, such standard errors tend to be downward biased; the conventional approach by practitioners in such circumstances is to use what is known as the windmeijer adjust to correct for small sample bias. Bond (2001) proposed a rule of thumb that first, the dynamic model should be initially estimated by pooled OLS and the LSDV approach, for example, using the within or fixed-effects approach. The pooled OLS estimate for ∅ should be considered on the upper-bound estimate, while the corresponding fixed effects estimate should be viewed as a lower-bound estimate.

This section presents the econometric methodology in sequential order to address the research objectives, as stated in Chapter 1:

$$y_{i,t} = \alpha y_{i,t-1} + \beta x_{i,t} + \mu_i + \varepsilon_{i,t,} \quad (1)$$

where:

- the variable $y_{i,t}$ represent one of the liquidity measures for bank *i* in time *t*;
- $x_{i,t}$ is a vector of independent variables for bank *i* in time *t,* to be more precise, they represent the bank-specific variable and macroeconomic variables;
- α is the slope of the lagged liquidity variable;
- β is the elasticity of the explanatory variables, for example., slope of variables;
- μ_i denotes fixed effects in bank *i*;
- $\varepsilon_{i,t}$ denotes the error term; and
- the subscript *i* denotes the cross-section and *t* represents the time-series dimension.

The central estimation used in this study was the two-step GMM; this is because the two-step GMM was more appropriate than other estimation techniques.

When a two-step estimator produces consistent point estimates but inconsistent standard errors, it is known as the two-step estimation problem. For example, two-step estimators use the first step problem because all the computations are performed jointly. Also, when using two-step GMM, it promotes efficiency, and reduces bias or more specific parameters in order to avoid the bias of the order due to the presence of many time dummies. The data transformation approach may be used to eliminate the dummies (Roodman, 2009). This is because the transformed equation can be treated as a partial likelihood and result in an ML estimator, which may have the same asymptomatic efficiency as the direct estimator. This study employed the two-step system GMM estimation approach of Arellano and Bover (1995) and Blundell and Bond (1998), with level and lagged values of the variables used as instruments. The two-step GMM system estimation approach is used in this study because it assumed an improvement from Arellano and Bond (2009) GMM estimation technique. The relationship between the bank performance and regulatory requirements and the independent variables of bank-specific factors and macroeconomic factors can be expressed mathematically as per equations 1 to 12.

$$ROE_{it} = (\alpha - 1)\Delta ROE_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta CAR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta \beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta \varepsilon_{it} \quad (1)$$

$$ROE_{it} = (\alpha - 1)\Delta ROE_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta NSFR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta \beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta \varepsilon_{it} \quad (2)$$

$$ROE_{it} = (\alpha - 1)\Delta ROE_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta LCR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta \beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta \varepsilon_{it} \quad (3)$$

$$ROA_{it} = (\alpha - 1)\Delta ROA_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta CAR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta \beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta \varepsilon_{it} \quad (4)$$

$$ROA_{it} = (\alpha - 1)\Delta ROA_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta NSFR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta\beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta\varepsilon_{it} \quad (5)$$

$$ROA_{it} = (\alpha - 1)\Delta ROA_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta LCR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta\beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta\varepsilon_{it} \quad (6)$$

$$NIM_{it} = (\alpha - 1)\Delta NIM_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta CAR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta\beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta\varepsilon_{it} \quad (7)$$

$$NIM_{it} = (\alpha - 1)\Delta NIM_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta NSFR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta\beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta\varepsilon_{it} \quad (8)$$

$$NIM_{it} = (\alpha - 1)\Delta NIM_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta LCR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta\beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta\varepsilon_{it} \quad (9)$$

$$ZSCORE_{it} = (\alpha - 1)\Delta ZSCORE_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta CAR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta\beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta\varepsilon_{it} \quad (10)$$

$$ZSCORE_{it} = (\alpha - 1)\Delta ZSCORE_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta NSFR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta\beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta\varepsilon_{it} \quad (11)$$

$$ZSCORE_{it} = (\alpha - 1)\Delta ZSCORE_{i,t-1} + \beta_1 \sum_{i=1}^{n} \Delta LCR_{it} + \beta_2 \sum_{i=1}^{n} \Delta INT_{it} + \sum_{i=1}^{n} \Delta\beta_3 SIZE + \beta_4 \sum_{i=1}^{n} \Delta NPL_{it} + \beta_5 \sum_{i=1}^{n} \Delta Dummy_{it} + \Delta\varepsilon_{it} \quad (12)$$

The symbols in these equations are explained in Table 4.2.

Table 4.2: Explanations of equation symbols

Symbols	Meaning of symbols
ROE	Return on equities of the bank, 'n' where n=12 (number of banks) at time/year 't', where t= (10 years) 2009, 2010, …, 2019.
ROA	Return on assets of the bank, 'n' where n=12 (number of banks) at time/year 't', where t= (10 years) 2009, 2010, …, 2019.
NIM_{it}	Net interest margin of the bank, 'n' where n=12 (number of banks) at time/year 't', where t= (10 years) 2009, 2010, ..., 2019.
$ZSCORE_{it}$	The Z-Score $_{it}$ is the bank performance adjusted for risk Z-Score $_{it}$' for bank 'i', where i=12 (number of banks) at time/year 't', where t= (10 years) 2009, 2010, …, 2019.
S_t	The vector o matrix (specific, e.g. capital requirements (CR), and NFSR).
∂b	Vector matrix of a coefficient variant of bank characteristics.
B_{it}	The 2X1 vector of the matrix for individual bank characteristics (size, profitability) for the bank "n", where n=12 at time/year, 't' where t= (10 years) 2009, 2010, …, 2019.
$Dummy_{it}$	The Dummy variables represents whether the bank complied with Basel III capital adequacy ratio or not 1- the bank was compliant with Basel III capital adequacy ratio; 0- the bank was not compliant with Basel III capital adequacy ratio
$\emptyset c$	1X2 ve ctor matrix of respective coefficients of country-specific control variable.
$\propto$	Constant term or intercept (formula).
$\in_{it}$	Is the error term (idiosyncratic errors).

Sources: Marozva (2017), Taranhike (2017), Matthews and Thompson (2014) and Heffernan (2010).

Although there is a plethora of literature on bank performance that indicates that regulations are one of the drivers of bank performance, most of the theoretical models and empirical models provide details on how regulatory requirements affect bank performance (Mathew & Thompson, 2014). However, there is a need to empirically test the effects of regulatory requirements that account for performance. Bank performance is a good example, which was put into perspective and tested empirically (Taranhike, 2017).

4.7 MEASUREMENT PERFORMANCE VARIABLES OF THE BANK

Leedy and Ormrod (2015) and Saunders *et al.* (2016) maintained that performance variables are individual components or characteristics of how data have been collected. Performance variables are the organisation's measurements, which are expressed in terms of performance and efficiency (Hu, & Liu, 2018; Coetzee). This section discusses the performance variables measurements in detail, using measurements from previous empirical studies.

The identified measurements helped the researcher to determine how the banks applied the regulatory framework. The purpose of this section is to provide a general overview of the performance of the locally registered South African banking industry by using selected performance indicators generally considered to be the most important to the industry (Coetzee, 2016:58).

4.7.1 Dependent variables

Bank performance was measured by net interest margins (NIM), which measure how successful an organisation is at investing its funds compared to its expenses for the same investment. A negative value shows that an organisation has not made an optimal investment decision because the investment expense exceeds the amount of returns generated by the investment.

According to Saksonova (2014), NIM is considered the most appropriate criterion for evaluating the effectiveness and stability of banks' operations, as it is superior to the return on assets in illustrating how successfully banks manage their interest-bearing assets.

The *formula for NIM* $= \frac{interest\ earnings - interest\ cost}{interest\ earning\ assets} X\ 100$ (4.7)

The overall risk-taking of the banks was measured by their Z-scores (RISK). This ratio is mostly applied in accounting-based measurements of bank risk. The Z-score is deducted from the probability that bank losses exceed the capital but under the unrealistic assumption of normally distributed return on assets (Swanepoel, Estheehuysen, van Vuurren & Lotriet, 2017; Chiaramonte, Crici & Poli, 2015). Most researchers use a ratio of non-performing loans, losses on loan distributions, total loan books or total earning assets and the bank's Z-score. The difference between the two formulas (NIM and Z-score) is that non-performing loans mainly proxy credit or default risk, whereas the Z-score proxies the overall risk exposure of the bank (Taranhike, 2017).

Bank's overall risk= (Z-score) Risk = $\frac{ROA + CAR}{\sigma\ (ROA)}$ (4.8)

All these are accounting-based ratios that are calculated from the bank's integrated annual financial statements.

Empirical studies by Klomp and De Haan (2015) explored whether the impact of the bank regulatory framework and supervision have affected the performance of banks, using ROA as a measurement. Findings suggest that the stricter the regulation and supervision, the better the bank performance. Liquidity restrictions also have a large positive impact on banks.

In this study on the banking regulatory framework, the following performance variables measurements − return on assets (ROA), return on equities (ROE) and capital adequacy ratio – are used.

4.7.2 Return on assets (ROA)

Matthews and Thompson (2014) argued that the performance of the bank is measured by its return on assets. Return on assets is measured by net income divided by the total assets of a bank.

The return on assets ratio has been used to measure profitability, productivity and efficiency, and provides management information on the performance of the bank (Marozva, 2015; Narwal & Jindal, 2015). ROA also helps to measure the progress of the organisation against its objectives. This ratio assesses the organisational use of resources and financial strength of the bank (Savoiu, Banuta &Gadoiu, 2013).

$$ROA=\frac{Net\ income}{Total\ asset}\ X\ 100 \qquad (4.9)$$

4.7.3 Return on equity

The return on equity is measured by dividing net income by shareholder equity. The purpose of this ratio is to measure returns generated to shareholders (Marozva, 2017). Organisations with a higher return on equity are usually more efficient in generating cash internally, rely less on debt financing and have a better return generated for shareholders (Hall & Geyser, 2004).

$$ROE = \frac{Net\ income}{Share\ holders} \qquad (4.10)$$

4.7.4 Independent variables

The independent variables for the study were the banks' capital adequacy regulations, Basel III liquidity ratios, private sector monitoring of banks and restrictions.

4.7.5 Capital adequacy ratio (CAR)

Capital adequacy ratio is the portion of capital that is kept aside by banks when giving out loans to customers as a provision to cover up losses in case customers are unable to pay loans. This provision limits the amount of deposits that may be loaned to customers and hence limits the creation of credit (Sulaiman & Mohammed, 2014). Capital adequacy is linked to the banking regulatory framework (Hu & Liu, 2018).

Formula for CAR= $\frac{Tier\ 1\ capital+Tier\ 2\ capital}{Risk\ weighted\ average}$ (4.12)

4.7.6 Basel III prescribed liquidity ratios

The following section discusses the liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) in detail in relation to this study.

LCR	$\frac{High\ quality\ liquid\ assets}{Cash\ outflows - Cash\ inflows}$
NSFR	$\frac{Available\ amount\ of\ stable\ funding}{Required\ amount\ of\ stable\ funding}$

4.7.7 Liquidity coverage ratio (LCR)

The financial crisis of 2007-2009 led to the introduction of Basel III, which addressed the weaknesses of Basel II. Banks were required to implement the Basel III requirements from 2015. The BCBS under the Basel III Accord, makes it mandatory for banks to hold liquid assets of high quality (BCBS, 2013). According to the BCBS (2013), LCR is the ratio needed to be implemented in a bid to promote short term resilience. Since 2015, banks have been required to hold assets against anticipated net liquid outflows for 30 days. Liquid assets primarily constitute cash, short term interbank lending, reserves with the central bank, marketable securities and any form of lending to the central bank within 30 days. Primary, liquid assets constitute cash, short-term interbank lending, whereas the denominator is expected net cash outflow within 30 days, i.e., the difference between bank anticipated cash inflow and bank expected cashflow (Marozva, 2017:106). The liquidity weights of the high-quality liquidity assets are determined by the margins required for each asset (BCBS, 2013). In summary, this component of LCR measures the funding liquidity risk of a particular institution.

4.7.8 Net stable funding ratio (NSFR)

Basel III requires banks to maintain a stable funding profile in the form of an NSFR (BIS (2014);

banks are required by central bank to have stability in their funds related to the structure of their assets and other off-balance sheet activities. According to the BCBS (2014), the NSFR is calculated by dividing the available amount of stable funding by the required amount of stable funding. This ratio should be greater or equal to 100% on an ongoing basis (BCBS, 2013). The available stable funding is the portion of equity capital and liabilities expected to be reliable over a given time under review for the calculation of the NSFR, which extends to one year (BCBS, 2014). According to Marozva (2017), the availability of the stable funding required of a particular bank is likely to be driven by the liquidity characteristics and remaining maturities of the different assets held by the bank, including off-balance-sheet assets.

4.7.9 Size of the bank

The size of a bank is measured by the value of total assets. The total market value of the securities in a fund is referred to as total assets (Nyoka, 2017).

One of the most critical questions regarding bank performance is whether or not bank size optimises performance (Kana, 2017). In general, the effect of size on bank performance is expected to be positive to a certain extent, however, for banks that are extremely large, the impact on size could negatively affect bank performance due to bureaucracy and other reasons. Studies by Taranhike (2017), Aladwan (2015), Mashonganyika (2015), Rahman and Bukair (2015) and Dewar (2014) and concluded that larger banks tend to focus more on other objectives as opposed to profitability, and lead to poor performance. Smaller banks' priority is profit-making because they still want to grow (Kana, 2017; Taranhike, 2017). Based on the findings of previous scholars, it is evident that the size profitability relationship may be expected to be non-linear.

4.7.10 Interest rates

Also known as the lending interest rate, the real interest rate is expected to have a positive relationship with performance, according to the lend-long borrowing short term argument (Klomp & De Haan, 2015).

On the other hand, a rise in real interest rates may increase the real debt burden on borrowings, which may lead to fewer assets, resulting in interest rates having a negative impact on performance (Nyoka, 2017; Gaganis & Pasiouras, 2013).

4.7.11 Non-performing loans

Non-performing loans are the amount of loans in a bank's loan portfolio to the amount of outstanding loans the bank holds (Chen *et al.,* 2017). This happens when borrowers have not made regular payments for at least 90 days, as then the loans are considered to be non-performing (NPL) (Reinhart & Trebesch, 2016). These are inclusive of both the interest component and the principal component (Marozva, 2017). According to Al-Khazili and Mirzaei (2017), the NPL makes a good proxy for the quality of bank assets, and consists of the most significant portion of the total assets of the bank. The quality of the assets of banks has a direct influence on performance (Abbas, Shahid Iqbal & Bilal Aziz,2019). Should a bank have a significant risk of default, this implies a substantial decline in the performance of the bank (Accornero, Alessadri, Carpinelli & Alberto, 2017). Again, failure to collect loans may translate that the bank is struggling and therefore, a bank run will be unavoidable.

4.8 LIMITATIONS OF THE STUDY

Data on the banking regulatory framework in South Africa only considered the period from 2009-2019. The study relied on secondary data; thus, the researcher assumed they were a true reflection of actual events. Due to the mathematical measurement and difficulty required in estimating the banks' variable on performance, in this study, accounting ratios were used to measure bank performance.

4.9 RELIABILITY AND VALIDITY

Reliability refers to the quality of the measurement method. Reliability recommends that adaptable data be collected at every occurrence if repeated observations of the same phenomenon were conducted (Leedy & Ormrod, 2010).

According to Gill and Johnson (2010), reliability relates to consistency, which is the extent to which the measuring tool will give similar results when applied several times to the same phenomenon under similar conditions. The reliability of secondary data is ensured by accessing a reliable and credible website, such as the SARB's. South African banks were studied for this research, and the data were evaluated using specific criteria. Audited financial statements of the individual banks were also used as secondary data, chiefly because of the reliability and trustworthiness of the institutional sources that compiled the data. This type of measurement has been used repeatedly in a variety of studies by different scholars, and produced accurate, consistent, comparable and reliable results. Locally registered banks in South Africa for the period 2009 to 2019 were the subject of the investigation, and the data were evaluated using criteria that focused on the type of annual report and the purpose of the report.

Leedy and Ormrod (2010) and Bash, Mouton, Sapsford and Jupp (1996) defined validity as a lack of self-contradiction, and consistency in the results. Validity refers to the extent to which the data collection method or research method is described. Validity can also refer to the measurement of what must be described or measured (Crowther & Lancaster, 2009). To ensure that the data collected were useful and adequate, and that the valid method was used to analyse the data selected, panel data regression.

4.10 ETHICAL CONSIDERATIONS

Leedy and Ormrod (2010) and Diener and Crandall (1978) encouraged the use of four main categories to ensure that research is conducted ethically. These categories include protection from harm, informed consent, right to privacy, and honesty with professional colleagues. These categories were applied to ensure that the research was conducted ethically.

For this research, a desktop study was used as the information was available in the public domain and was secondary in nature. An ethics application for conducting research using existing data was submitted to the Research Ethics Committee at the University of South Africa (UNISA).

The researcher also requested permission to receive data from the SARB, which was granted by UNISA's Ethics Review Committee.

The researcher confirms that the methods, results, findings, conclusions and recommendations made in this study will only be used for academic purposes and remains the property of UNISA.

The results, findings and conclusions remain the property of the UNISA, and will only be disclosed by the university if necessary and only to authorised officials.

4.11 SUMMARY CHAPTER

In this chapter, the study presented sources of data collected. The financial ratio technique and macroeconomic factors were adopted to estimate the relationship between bank performance and regulatory requirements. The study used twelve South African Banks registered in terms of the Banks Act 94 of 1990. In this study, the researcher also discussed the methodology used to analyse the data, was used to enable the researcher to determine measurement testing, and to determine the outcome of this study. The next chapter presents the results of the empirical analysis, as it related to panel data investigations of the selected South African Banks, and discusses major findings, and make recommendations for future research.

CHAPTER 5: DATA ANALYSIS AND DISCUSSION OF RESULTS

5.1 INTRODUCTION

This chapter analyses the findings of this empirical study on the effect of bank regulation on bank performance in South Africa using the balanced panel data, where all the variables are observed for each cross-section and each period. This study incorporated time series data for the period 2009-2019 and the cross-section segments of 12 banks in South Africa. Initially, the chapter presents the relationship between bank performance and bank regulation, the descriptive statistics of the selected variables, a correlation analysis determining how the variables are related, and finally, the estimated models. The Hausman test was used to determine whether to use the fixed effects model or the random-effects model. In this case, the fixed effects model was considered most appropriate. The panel data was then diagnosed for the presence of autocorrelation and heteroscedasticity. The regression was used to quantify how many of the explanatory variables impacted on ROA. The model was fitted to the data for each dependent variable using only continuous explanatory variables.

5.2 DATA AND DESCRIPTIVE STATISTICS

In this section, the data sources and sample used in the current study are discussed. Moreover, descriptive statistics are presented briefly below.

5.2.1 Descriptive statistics variables

The summary statistics of the variables used in the estimations for the entire sample of the banks were considered in the research. The sample of this study was 12, and using pooled estimates, the descriptive statistics for the performance measures are presented below in Table 5.1. The table below reports the mean, median, maximum, minimum, standard deviation and number of observations. The descriptive statistics are then presented; a total of 120 observations were used in the study. The descriptive statistics for the bank performance measures, the Basel III profitability measures on (LCR, NIM and NSFR) were drawn from the estimation model calculated on standard deviations and are summarised in Table 5.1.

Table 5.1 Descriptive statistics: Analysis from 2009 to 2019

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
CAR	0.1386	0.0852	0.4374	0.0373	0.0964	120
UNEMPL	0.2549	0.2500	0.2870	0.2250	0.0165	120
GDPG	0.0078	0.0050	0.0600	(0.0270)	0.0209	120
INT	0.0682	0.0699	0.1061	0.0507	0.0146	120
LCR	1.6936	1.6029	4.8135	0.8461	0.4968	120
LOAN	0.7046	0.0904	82.9824	(0.9827)	6.9079	120
NIM	0.0696	0.0435	1.3764	0.0007	0.1306	120
NPL	0.0135	0.0073	0.1234	(0.0011)	0.0214	120
NSFR	0.2361	0.2641	0.5774	0.0080	0.1336	120
ROA	0.0169	0.0166	0.0244	0.0152	0.0014	120
ROE	0.3854	0.2262	9.0869	0.0045	0.8803	120 120
SIZE (000)	4,425,467	3,935,225	1,410,421,761	1,472,065	1.0539	120

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
PRIME_RATE	0.1004	0.0988	0.1500	0.0850	0.0166	120
Z_SCORE	19.8212	17.5883	55.7306	0.2340	14.0276	120

Source: Authors computation

As illustrated in Table 5.1, the primary measure of bank regulatory requirements is the capital adequacy ratio (CAR), which measures the solvency of the banking sector. Basel III recommends that banks maintain a CAR of 8%, as discussed in Chapter 2. As per the analysis above, there was a total number of observations of 144, the average CAR was found to be 13.86%, and the standard deviation was 9.64%.

The minimum CAR was 3.73%, and the maximum was 43.47%, indicating that during the study period, the least capitalised bank was below the 8% recommended by Basel III. The majority of banks' CARs were above the recommendations of Basel III. A higher CAR indicates that regulatory authorities are strictly enforcing capital requirements.

The unemployment rate (UNMPL) in South Africa, on average was 25.49%, which shows that there was an increase from the unemployment rate. The minimum was 22.5%, and the maximum was 28.7%, giving a range of unemployment of -6.2%. The standard deviation for unemployment was -1.65%.

The increase in the unemployment rate could be the result of high-interest rates and the global recession. Unemployment causes workers to suffer financial difficulties that may lead to emotional difficulties, while consumer spending, which is one of the economy's key drivers of growth, goes down, leading to an even worse recession or even depression when left unchecked.

As per Table 5.1, the GDP growth rate (GDPG) had a mean of 0.0078, a minimum of 0.0270, a maximum of 0.0600, and a standard deviation of 0.0209. GDPG measures the growth of the economy; thus, the results indicated that between 2007 and 2019, the South

African economy grew on average 0.78%. The leading cause of the negative economic growth was weak aggregate demand. Another reason was that the GDP growth was statistically significant, which affected the liquidity of the banks under review.

The average interest rate (INTR) was 0.0682. Currently, in South Africa, the INTR is 4.25%, and the rate of 0.0682 is higher than the current rate. This could be caused by the unstable economy. The minimum INTR was 0.057, the maximum was 0.1061, and the standard deviation was 0.0146, implying a range of 0.0554 during the period of the study. The standard deviation for interest rates were 0.0146.

The average liquidity coverage ratio (LCR) for the period of the study was 1.6936, the minimum was 0.8461, the maximum was 4.8135, and the standard deviation was 0.4968. The average LCR for the banks showed that they held a large portion of high liquidity assets, even where a funding gap was possible. According to Basel III, a number which is above one is considered to be good because it represents high-quality assets, and the bank will be able to cover its short-term liabilities. Therefore, the mean of 1.6936 is a good ratio as it is above 1, and on average, the banks were able to pay their short-term debt within 30 days. The minimum was 0.8461, meaning that of the banks under review, one appears to have an LCR problem. This implies that it was unable to cover its short-term obligations. The low LCR may be due to the financial market turmoil at the time of this study, market liquidity may have decreased, and the bank might have been under pressure to comply with the prescribed LCR requirements. This may primarily have been driven by risk-averse depositors moving out of long-term funding into short term funding. The maximum LCR was 4.8135, which is very good. The majority of banks were thus able to pay their short-term liabilities within 30 days. LCR represents one of the critical regulatory reforms of Basel III, which aimed to develop a more resilient banking sector. Its objective was to promote the short-term resilience of banks. The standard deviation was 0.4968.

The LOANS growth rate on average was 70.46%, the minimum growth rate was -0.9827, the maximum was 82.9824, and the standard deviation was 6.9079.

In light of the above preliminary analysis, this explains that the most profitable banks have quite a substantial loan advantage.

NIM is an indicator of the financial stability of banks. The net interest margin (NIM) was on average 6.96%, the minimum was 0.07%, the maximum was 137.64 %, and the standard deviation was 13.06%. The mean, minimum and maximum had positive percentages, which suggests that all the banks under review for the period of the study were operating profitably.

The descriptive statistics showed that the non-performing loans (NPL) on average was0.0135, the minimum was -0.0011, the maximum was 0.1234, and the standard deviation was 0.0214. The descriptive statistics analysis reveals that some banks generally have a low-risk preference as perceived by having low ratios on loans loss provisions of totals loans and higher overall risk computed in Z-scores. These banks were also characterised by low NIM, indicating that they lend to low-risk customers at the lowest interest rates.

The net stable funding ratio (NSFR) for the period under review showed an average of 0.2361, a minimum of 0.0080, a maximum of 0.5774, and a standard deviation of 0.1336. This is evidence that majority of banks are not managing their NSFR well, as other banks were able to maintain the minimum acceptable ratio of greater than one as recommended by Basel III. With a mean of 0.2361, a minimum of 0.0080 and a maximum of 0.5774, all the ratios were below the acceptable ratio.

NSFR provides effective protection for liquidity shortages and mismatches. Following the above analysis of NSFR, the conclusion can be reached that that majority of banks under review failed to comply with the NSFR minimum requirements as recommended by Basel III. This could be caused by the early liquidity phase of the financial crisis starting in 2007, when many banks, despite the existing capital requirements, experienced difficulties, for example, they were not prudently managing their liquidity.

The main measures of the banks' profitability were return on assets (ROA) and return on equities (ROE). Table 5.1 indicates that the banks under review, in general, had positive ROEs and low ROAs over the period of analysis. The ROAs and ROEs had an average of 1.69%, and 38.54%, with a minimum of 1.152% and 0.45% and a maximum of 2.44% and 9.0869% respectively. The average ROA was not good relative to the stock market, the negative impact on net income, and the heaviness in the total assets holding. The average ROA was far below the inflation rate during the period of the study. A ROA of 5% and above is considered to be good; in this review, the ROA was below the minimum required. Any rate greater than 10 % is good because it covers the cost of capital on ROE. The ROE was also above inflation, which makes the ROE a good rate. The standard deviation for ROA was 0.0014, and for ROE was 0.8803.

Table 5.1 shows that the average size of the bank's total assets was R4,425,467, the minimum was R14,010,421,761, and the maximum was R1,472,065. This shows significant growth size, which is in line with the growth in asset base and the loan growth. The standard deviation was 1.0539.

The descriptive statistics showed that the prime rate on average was 10.4% with a minimum of 8.085%, a maximum of 15%, and a standard deviation of 1.66%. On average, the banks were able to maintain a 10.4% prime rate compared to the current prime rate of 10.25%. It is therefore clear that banks are still able to make a higher profit through properties and bonds should there be any movement in the prime and repo rates.

The Z-score on average was 19.8212, and the median was also close to the average at 17.5883. The minimum was 0.2340, the maximum was 55.7306, and the standard deviation was 14.0276. The following are the correlations between the main variables employed in this study.

Table 5.2: Cross-correlation table analysis- bank performance measurement and independent variables

Variables	Z_SCORE	ROE	ROA	NIM	CAR	NSFR	LCR	GDPG	INT	EMPL	NPL	SIZE	PRIME_RATE	LOAN
Z_SCORE	1													
ROE	-0.2501***	1												
ROA	0.1841**	-0.016494	1											
NIM	-0.1282	0.9104	-0.0469	1										
CAR	0.0967	-0.0402	-0.1673	0.1663**	1									
NSFR	0.0876	-0.1621*	0.046	-0.1215	-0.4501	1								
LCR	0.0904	-0.1369	-0.0872	-0.0014	0.0148	0.7278	1							
GDPG	0.0377	0.0336	0.0854	0.0351	0.1042	-0.0715	-0.0447	1						
INT	0.0200	0.1486*	0.0345	0.1913**	-0.0159	-0.0402	-0.0238	-0.2131*	1					
EMPL	-0.0193	-0.1834**	0.0190	-0.2054**	-0.1054	0.0650	-0.0503	-0.2979***	-0.1109	1				
NPL	0.0528	0.4704***	-0.0379	0.6346***	0.1607*	0.2685***	0.5404***	0.0262	0.0837	-0.1133	1			
SIZE	0.1452*	-0.1839**	0.2906***	-0.2691***	-0.5546***	0.6500***	0.1863**	-0.0579	-0.0127	0.1675**	-0.0252	1		
PRIME_RATE	0.0227	0.1889**	0.0243	0.2327***	0.0092	-0.0485	-0.0098	-0.1023	0.9666***	-0.3263***	0.1030	-0.0527	1	
LOAN	-0.1037	-0.0295	-0.0221	-0.0382	-0.0605	0.1284	0.0830	-0.0354	-0.0002	-0.0151	-0.0433	0.0664	-0.0139	1

Where *** (p<0.01), **(P<0.05), *(p<0.1)

Table 5.2 above presents the results of the preliminary data analysis on the effects of bank regulations on bank performance using independent variables and bank-specific variables.

The findings show that there is a negative relationship between ROE and risk adjusted performance measured by Z-score and the coefficient is -0.2501. However, the relationship is fragile but significant. There is a significant positive relationship between Z-score and two variables, namely ROA (0.1841) and size of bank (0.1452), and the relationship is weak.

ROE is negatively correlated with ROA (-0.1694), NSFR (-0.1621), UNEMPL (-0.1838) and size (-0.1839), and the relationship is weak but significant. ROE is also positively related to INT (0.1486), NPL (0.4704), and prime rate (0.1889).

The relationship is significant but weak. ROA is positively related to size (0.2691), and the relationship is weak but significant.

NIM is positively correlated with the three variables, namely the CAR (0.1663), INT (0.1913) and prime rate (0.2327); the relationship is significant but weak. There is a strong positive, significant correlation relationship between NIM and NPL (0.6364). The NIM is also negatively correlated to UNEMP (-0.2054) and size (-0.2691); however, the relationship is substantial but weak not contradictory.

There is a positive relationship between CAR and NPL (0.1607), which is significant but weak. Again, the bigger the size of the bank, the lower the CAR because there is a negative relationship. The higher the NSFR, the higher the NPL, and the relationship is significant but weak. There is also a strong significant positive relationship between NSFR and size (0.6500).

The correlation analysis revealed a significant and robust relationship between LCR and NPL. There is also a positive relationship between LCR and size (0.1863); the relationship is significant but weak. GDPG is negatively correlated to two variables, which are INT (-0.2131) and UNEMP (-0.2979). The relationship is significant but weak. INT indicated a strong positive relationship with prime rate (0.9666), which is significant.

Lastly, there is a positive relationship between UNEMP and size (0.1675), and the relationship is weak and significant.

The results are presented in four sections. The regression results are shown in Tables 5.3 to 5.10. Each table has seven columns representing four regression equations defined in Chapter 4. The dependent variables for each regression equation are shown on top of each table as ROE (return on equities), ROA (return on assets), NIM (net interest margin and Z-score (the overall risk-taking as measured by Z-score). The rows are the independent or explanatory variables that are the regressors in the regression equations.

The first three dependent variables, namely ROE, ROA and NIM, represent the performance of the bank, whereas the last variable, namely the Z-score, as a measure of bank performance adjusted for risk. Tables 5.3 to 5.10 summarise the regression results and post-diagnostic estimation statistics obtained from the analysis of the banks under review. The tables also show the regression results obtained using the fixed effects method for robustness.

Table 5.3: Empirical results for Models 1 to 3 where ROE is the profitability measure

	2 Step System GMM Equation 1	Fixed Effects Model	2 Step System GMM Equation 2	Fixed Effects Model	2 Step System GMM Equation 3	Fixed Effects Model
L.ROE	0.427***	0.400***	0.518***	0.409***	0.471***	0.402***
	(0.0429)	(0.0121)	(0.0815)	(0.00701)	(0.0321)	(0.00855)
CAR	-6.637*	-0.312				
	(2.879)	(0.610)				
SIZE	-0.399**	-0.0657	0.773	-0.00794	0.111	-0.0556
	(0.118)	(0.0795)	(0.695)	(0.0402)	(0.168)	(0.0385)
NPL	-9.302**	1.708	-10.50*	1.005	-6.849*	0.910
	(2.476)	(1.156)	(4.565)	(0.781)	(2.714)	(0.788)
INT	-32.47*	-2.721	-32.19*	-3.097	-21.68*	-2.736
	(11.59)	(3.904)	(10.92)	(4.347)	(8.541)	(4.050)
DUMMY	0.0780	0.0121	0.309	0.00385	-0.192*	-0.00386
	(0.185)	(0.0338)	(0.391)	(0.0356)	(0.0729)	(0.0430)
NSFR			-6.385	-0.290		
			(4.216)	(0.187)		
LCR					-1.141	-0.0793
					(0.631)	(0.0723)
_cons	6.275***	0.863	-2.141	0.480	2.845*	0.896
	(0.605)	(0.909)	(4.711)	(0.329)	(0.957)	(0.558)
N	132	132	132	132	132	132
R^2		0.768		0.770		0.772

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: Authors computation

Table 5.4: Post estimation diagnostic statistics for 2-step system GMM model results presented in Table 5.3

	2 Step System GMM	2 Step System GMM	2 Step System GMM
	Equation 1	**Equation 2**	**Equation 3**
Arellano-Bond AR(1)	-0.92	-1.71	-0.91
Prob>z	0.358	0.479	0.362
Arellano-Bond AR(2)	1.55	0.98	-0.66
Prob>z	0.121	0.325	0.511
Sargan test of overid	8.11	12.35	11.39
Prob>χ^2	0.230	0.054	0.170
Hansen test of overid	9.37	5.56	4.81
Prob>χ^2	0.154	0.475	0.569
Instruments	12	12	12

Source: Author's computation

The post-diagnostic statistics showed that the models are robust and not weakened by any instrument as the number of instruments does not exceed the number of groups. Table 5.3 captures the results for the regression analysis between bank performance as measured by ROE and the independent variables. The equation one output represents the relationship between ROE and CAR, amongst other control variables. Table 5.3 shows the estimation results, and there is a positive and significant relationship with the previous ROE. This confirms the results that Marozva (2017) found that the ROE is persistent as; ROE depends on the previous level of ROE. There is a negative and significant relationship between ROE and CAR. These results show that banks with higher capital are associated with lower returns on equities, and banks with lower capital are associated with higher returns on equities. This simply means that banks with higher capital have lower performance relative to lower capital. Banks with lower CAR tend to take more risks, and as a result, they tend to perform better.

These results are in line with those of Taranhike (2017), Soile-Bologum (2017) and Yusuf and Ekundayo (2018), who also found a negative relationship between CAR and bank performance.

The regulatory implication is that a lower CAR should be maintained by banks to improve their performance. Banks should keep their CAR as low as possible as long as it is above the minimum threshold required of 10%. Allen, Carletti and Marquez (2011) argued against the buffer capital adequacy theory, i.e. that banks that hold capital above minimum regulatory requirements, but this does not prevent banks from poor financial performance. These scholars found a negative deterministic relationship between capital adequacy and bank performance.

In equation one, there is a negative and significant relationship between the ROE and size, i.e. the bigger the bank, the worse it performs. This implies that when banks become too big, they tend to focus on other objectives as opposed to profit-making, yet for smaller banks, profit-making is a priority because they still want to grow. These results are in line with Taranhike (2017), Bukair and Rahman (2015), Mashonganyika (2015), Dawar (2014) and Jara-Bertin (2014), who have also found a negative relationship between ROE and performance.

The results further indicate that there is a significant negative relationship between NPL and ROE, meaning the higher the NPL, the lower the performance. This result is in line, with of Charmier *et al.* (2018) and Chen *et al.* (2017), who also found a negative relationship between NPL and bank performance. As per equation one, there is a negative relationship between INT and ROE, meaning the higher the interest rate, the worse the performance of the bank. These results corresponded with those of Charmier *et al.* (2018) and Chen *et al.* (2017), who also found a negative relationship between INT and bank performance. However, the dummy variable was not significant in this case, i.e. there is no significant difference between banks that are compliant and those that are not compliant with Basel III capital adequacy ratio.

Equation two shows the relationship between ROE and liquidity as measured by NSF, amongst the other control variables. ROE is mainly with one of the regulatory variables which are NSFR representing liquidity as prescribed by Basel III. Unfortunately, in this case, there is a negative relationship, but the relationship is not significant. In equation two, ROE is persistent because it depends on previous ROE.

The relationship is positive and significant, which confirms the results in equation one. The coefficient was insignificant of the size insignificant. The NPL is negative and significant, which confirms the findings of equation one. There is a negative relationship between ROE and INT, which reinforces the results of equation one. The dummy variable was not significant, i.e. there was no significant difference between those banks that comply and those that do not, which thus confirms the results of equation one.

As per equation three, there is a significant positive relationship between ROE compared to the previous ROE, which confirms the findings in equations one and two. Equation three captures the relationship between ROE and LCR. Unfortunately, the relationship is not significant but negative. The relationship between ROE and size is positive but not significant. With NPL, there is a significant negative relationship, which is in line with equations one and two. There is a negative and significant relationship between ROE and size, which is in line with equations one and two. The dummy is significant, i.e. there is a difference between the banks that comply and those that do not. These results are similar to those of Ofoeda (2016), Klomp and Haan (2015) and Alan (2013), who concluded that consistency in complying with strict regulations sustains banks, prevent failures and increases efficiency. The next section discusses the relationship between ROA and bank performance.

Table 5.5: Empirical results for Models 4 to 6 where ROA is the profitability measure

	2 Step System GMM Equation 4	Fixed Effects Model	2 Step System GMM Equation 5	Fixed Effects Model	2 Step System GMM Equation 6	Fixed Effects Model
L.ROA	0.234	0.354***	0.265	0.352***	0.473*	0.353***
	(0.459)	(0.00586)	(0.455)	(0.00356)	(0.211)	(0.00498)
CAR	0.00761**	0.000258***				
	(0.00918)	(0.000500)				
SIZE	6.32e-08	0.000106	-0.0000145	0.000144	0.0000306*	0.0000492*
	(0.00117)	(0.000114)	(0.00127)	(0.000174)	(0.000945)	(0.0000760)
NPL	-0.0111*	-0.00475***	0.0204	-0.00565*	0.0267	-0.00547*
	(0.0459)	(0.00578)	(0.0457)	(0.00680)	(0.0465)	(0.00659)
INT	0.0109	-0.00380	-0.000313**	-0.00446**	-0.00440*	-0.00359**
	(0.0189)	(0.00410)	(0.00887)	(0.00489)	(0.0123)	(0.00389)
DUMMY	-0.00189	0.0000625	-0.00110	0.0000647	-0.00145	0.0000582
	(0.00210)	(0.0000623)	(0.00140)	(0.0000697)	(0.00102)	(0.0000594)
NSFR			-0.00139	-0.000882		
			(0.00739)	(0.00102)		
LCR					-0.000340*	-0.0000944**
					(0.00137)	(0.000127)
_cons	0.0122	0.0103***	0.0132*	0.0104***	0.0101**	0.0110***
	(0.00623)	(0.000711)	(0.00459)	(0.000827)	(0.00316)	(0.000487)
N	132	132	132	132	132	132
R^2		0.325		0.328		0.326

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Author's computation

Table 5.6: Post estimation diagnostic statistics for the 2-step system GMM model results presented in Table 5.5

	2 Step System GMM	2 Step System GMM	2 Step System GMM
	Equation 4	**Equation 5**	**Equation 6**
Arellano-Bond AR(1)	-0.63	-0.71	-0.96
Prob>z	0.531	0.480	0.337
Arellano-Bond AR(2)	-1.18	-0.97	-1.05
Prob>z	0.239	0.331	0.293
Sargan test of overid	4.29	3.89	7.17
Prob>χ^2	0.638	0.692	0.305
Hansen test of overid	2.42	1.46	1.64
Prob>χ^2	0.878	0.962	0.950
Instruments	12	12	12

Source: Author's computation

The post-diagnostic statistics showed that the models are robust and are weakened by any instrument as the number of instruments does not exceed the number of groups, and there is no autocorrelation and all instruments are valid. Table 5.5 captures the results for the regression analysis between bank performance as measured by ROA and the independent variables. The analysis focuses on two-step GMM results as this was the most appropriate estimation technique; however, the fixed effects model results are presented for robustness. Equation 4's output represents the relationship between ROA and CAR, amongst other control variables.

Table 5.5 shows that there is a positive and significant relationship between ROA and CAR. This result is similar to that of Kana (2017), Majumder and Li (2017), Nyoka (2017), Okoye *et al.* (2017), Ofoeda *et al.* (2016), Rachdi and Ben Bouhen (2016) and Almazari (2013), who concluded that there is a positive relationship between ROA and bank performance. The results showed that ROA has a statistically more significant and positive effect on CAR than previous ROA.

Furthermore, a positive relationship between ROA and CAR suggests that less working capital can lead to an increase in performance. These findings show that banks with higher capital are associated with a higher return on equities, and banks with lower capital are associated with lower returns on equities. These means that banks with higher capital perform higher s relative to those with lower capital, and banks with lower CAR tend to take more risk, and as a result, tend to perform worse. The results of equation four further revealed that there is a significant negative relationship between ROA and NPL, i.e. the higher the NPL, the lower the performance. This result is in line with Chen *et al.* (2017), who also found a negative relationship between NPL and bank performance. The dummy variable was not significant; therefore, there was a significant difference between the banks that are compliant with Basel III capital adequacy ratio and those that do not.

Equation five shows that there is a positive but insignificant relationship between ROA and the previous ROA, which confirms the results of equation four. Equation five's output represents the relationship between ROA and NSFR, amongst other control variables. There is a negative relationship between ROA and NSFR, but the relationship is not significant. There is a negative and significant relationship between ROA and INT, meaning the higher the interest rate, the lower the performance of the bank. These results are contrary to those of Charmier *et al.* (2018), Kana, (2017), Marandu and Sibindi (2016) and Ngure (2014), who found a positive relationship between ROA and INT. According to Ngure (2014), this positive relationship has a beneficial effect on banks, which may be crowded out by reduced demand for loans. The contrast could be that in their studies, the different independent variables, populations and periods of the study were different from the current study. Another factor of this negative relationship could be the recession experienced globally.

Schumpeter (1939) proposed a cycle theory for the fluctuation of INTR, which leads to a negative relationship with bank performance. This theory assumes that recessions and periods of economic growth are the reason for exogenous changes in the real economic environment, and lead to a decline in bank performance.

This, in turn, leads to a fall in the price of assets, increase in NPL, lowers borrowers' financial capacity, increases UNEMPL levels and depresses the value of the collateral as a secondary means of servicing debts. Schumpeter (1939) also criticised the theory, which has a common misconception that macroeconomy is purely a shock to supply as opposed to a shock to demand and ignores the demands of the economy.

According to Hanweck and Ryu (2005), fluctuations in interest rates have a significant positive relationship with ROA. This is because interest rates are closely related to returns on a bank's liabilities, which will quickly adjust with changes in interest rates in the financial market. Given the discussion above, it is clear that ROA is influenced by long-term interest rates and slowly adjust to the changes in the market. In relation to this study, the theory views INTR changes as a normal economic occurrence which will affect a bank's performance.

The theory disregards the argument that INTR is determined by liquidity in the economy, but is defined by the prevailing macroeconomic environment as determined by the business cycle. Moreover, according to the theory, INTR will keep on changing according to the macroeconomic environment.

In equation six, the estimation results show that there is a positive and significant relationship between ROA and the previous ROA. This confirms the results of Marozva (2017), who found persistent results with the previous ROA. Equation six investigated the relationship between ROA and liquidity as measured by LCR, amongst the other control variables. There is a negative and significant relationship between ROA and LCR, which correlates with the findings of Sahyouni, and Wang (2019), who also investigated the relationship between liquidity as measured by LCR and bank performance and found a statistically negative and significant relationship. The practical implication of this result is that bank managers must practice the principles of trade-off theory between, the advantages and disadvantages of liquidity creation and consider the negative relationship between liquidity creation and bank performance when making decisions.

The results support insolvency, which posits that liquidity creation can increase the level of illiquidity risk, which in turn reduces the performance of the bank and increases the probability of solvency. The results are consistent with those obtained in the robustness check. The size was positively related to ROA, and the relationship was significant.

This result is in agreement with Ali and Paul (2019), Rassid (2017), Singh and Sharma (2016), Terreza (2015), Jara-Bertin, Moya and Parales (2014) and Westhuizen and Oberholzer (2003), who also found a positive relationship between ROA and size. The above scholars concluded that larger banks focus more on other objectives, as opposed to smaller banks that focus more on profitability. An increase in bank size is thus associated with poor performance. This result is contrary to theoretical predictions that larger banks are more effective, an increase in size undermines performance. The results of this study suggest that reducing the size of banks increases bank performance. The relationship between ROA and INT was negative and significant. This result is similar to that of Ali and Paul (2019), Ariwati and Maksum (2018), Rasid (2017), Jara-Bertin, Moya and Parales (2014) and Westhuizen and Oberholzer (2003). Their study implies that firstly, performance increases as the bank size decreases, while bank size increases as the size bank performance decreases. In a nutshell, the size of the bank affects profitability. The current study agrees that small and medium banks are likely to be more profitable than large banks. The dummy is not significant, which is in line with equation four and equation five. The following section discusses the relationship between NIM and bank performance.

Table 5.7: Empirical results for Models 7 to 9 where NIM is the profitability measure

	2 Step System GMM Equation 7	Fixed Effects Model	2 Step System GMM Equation 8	Fixed Effects Model	2 Step System GMM Equation 9	Fixed Effects Model
L.NIM	0.509***	0.360***	0.593***	0.361***	0.525***	0.343***
	(0.0513)	(0.0339)	(0.0990)	(0.0380)	(0.0593)	(0.0367)
CAR	-0.444**	0.299**				
	(0.570)	(0.0778)				
SIZE	-0.0437	-0.0176	0.0640	-0.0404	-0.00698	-0.0611
	(0.0423)	(0.0305)	(0.117)	(0.0312)	(0.0406)	(0.0294)
NPL	-3.586**	0.531	-3.599**	0.461	-3.313*	0.423
	(0.892)	(1.109)	(1.077)	(1.251)	(1.075)	(1.294)
INT	-2.437**	0.282	-3.197*	0.269	-2.053**	0.427
	(1.436)	(0.254)	(1.207)	(0.316)	(1.484)	(0.263)
DUMMY	0.0262	0.00979	0.0404	0.0160	0.0149	0.0134
	(0.0329)	(0.00680)	(0.0645)	(0.0104)	(0.0248)	(0.00816)
NSFR			-0.725*	-0.124**		
			(1.011)	(0.0550)		
LCR					-0.115**	-0.0349**
					(0.160)	(0.00862)
_cons	0.610	0.0976	-0.0644	0.342	0.440	0.523
	(0.320)	(0.245)	(0.740)	(0.235)	(0.204)	(0.240)
N	132	132	132	132	132	132
R^2		0.807		0.799		0.813

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: Author's computation

Table 5.8: Post estimation diagnostic statistics for 2-step system GMM model results presented in Table 5.7

	2-Step System GMM	2-Step System GMM	2-Step System GMM
	Equation 7	**Equation 8**	**Equation 9**
Arellano-Bond AR(1)	-1.08	-1.35	-1.46
Prob>z	0.280	0.175	0.145
Arellano-Bond AR(2)	0.70	0.04	-0.11
Prob>z	0.484	0.972	0.910
Sargan test of overid	3.26	1.76	3.53
Prob>χ^2	0.775	0.940	0.740
Hansen test of overid	6.54	5.75	8.72
Prob>χ^2	0.366	0.452	0.190
Instruments	12	12	12

Source: Author's computation

The post-diagnostic statistics showed that the models are robust and not weakened by any instrument as the number of instruments does not exceed the number of groups. Table 5.7 captures the results for the regression analysis between bank performance as measured by NIM and the independent variables. The analysis focuses on the two-step GMM's results as they were the most appropriate estimation technique. The fixed-effects model results are also presented for robustness.

Equation seven shows the relationship between NIM and CAR, amongst other control variables. Table 5.7 shows the estimation results for equation seven, where there is a positive and significant relationship between NIM and the previous NIM. These confirm the results of Charmier *et al.* (2018), Lee and Lu (2015) and Joshi (2004), who also found that the previous NIM is persistent as current, and NIM depends on the legged level of NIM.

Equation seven shows a negative and significant relationship between NIM and CAR with a coefficient of -0.444, which is in contrast with the study's expectations.

The researcher expected to find a positive relationship since the majority of the banks under review maintained higher levels of capital. This result also contradicts that of Majumder and Li (2017), Aktasa (2015) and Osie-Assibey and Aseno (2015), who found a significant positive relationship between NIM and CAR. Osie-Assibey and Aseno (2015) concluded that a high net minimum capital requirement would widen the spread between the lending rates and savings rates; however, this study's results suggest that a higher CAR weakens the spread between lending rates and savings rates. The current study contributes to the research of the above scholars by finding that having CAR than the minimum requirements does not guarantee better performance of the bank. The negative coefficient suggests that banks create more loans when they have access to capital over the requirement threshold, leading to more non-performing loans. Banks must discourage reckless lending by increasing the cost of borrowing to customers and adhere to the minimum CAR. The adoption of the Basel III Accord would assist banks by reducing the equity pressure of making more profits by giving out bad loans or making bad credit decisions, which in turn leads to NPL. Complying with the minimum capital requirements would be ideal as a buffer against risk.

NPL is negatively and significantly related to NIM, which is in line with Le (2017) and Dhar and Bakshi (2015), who found a negative relationship between NIM and bank performance. The evidence suggests a trade-off between NPL and traditional lending, as the majority of the banks under review for the period 2009 to 2019 tend to use NPL to expand leverage by not adhering to lending requirements, thus leading to economic downturns. For this reason, the banks are exposed to a greater risk of NPL, thus bank supervisors, policymakers and regulators must assist banks to comply with lending requirements in terms of the Banking Act 94 of 1990. According to Dhar and Bakshi (2015), banks must make a provision against NPL because this helps for the stability of the banking sector. Provision can be made by identifying an appropriate cause of NPL, which is important for managing the credit portfolio of a bank.

The banks under review must thus give adequate attention to NIM and CAR to control the problems with NPL. Again, the Basel III Accord emphasises the rate of CAR as an important driving factor for the financial soundness of banks.

The INT shows a significant negative relationship, which is as per Iftikhar's (2016) findings. It is important to note that in a weakly regulated and supervised bank environment, financial liberalisation tends to hurt NIM; thus, these empirical findings suggest that sound and strong financial reform policies play a significant role in narrowing interest margins. Some of the banks under review are facing high-interest margins, which can be reduced by taking measures such as deregulating interest rate controls, removing of entry barriers and strengthening regulations. These procedures will increase the competition, efficiency and stability of the banking system, leading to a reduction of NIM. The dummy variable was not significant.

Table 5.7 shows the estimation results for equation eight, which found a positive and significant relationship between NIM and the previous NIM. This confirms the findings of equation seven. The NPL is negatively and significantly related to NIM which also confirms the results of equation seven. The dummy was not significant, which further reinforces the results of equation seven. The NSFR is negatively and significantly related to NIM. This confirms financial fragility theory; the findings confirm that any policy implemented with the intention of increasing bank capital is good for liquidity since the financial fragility is crowding out the bank deposit ratio by outweighing the risk absorption, which suggests a negative relationship between bank capital and bank liquidity (Marozva, 2017). Diamond (2006), in his early studies, indicated that limited capital, highly fragile banks tend to hold higher liquidity buffers than more stable and less vulnerable banks.
In equation nine, the estimation results show a significant positive relationship between the NIM with the previous results, which confirms the findings of equation seven and equation eight. The estimation results from equation seven to equation nine revealed that NIM is negatively and significantly related to NPL. This implies that as the banks' NPLs decrease, their performance as measured by NIM decreases.

This result confirms the findings of equation seven, equation eight and equation nine that the banks under review lack appropriate control when it comes to borrowing. Banks must, therefore, thoroughly conduct a risk assessment, sensitivity analysis and a stress test analysis when managing their loans books. The estimation results of equation seven, equation eight and equation nine show that NIM is negatively and significantly related to INTR. This implies that the banks' INTR increases bank performance as measured by NIM. The results confirm the findings of equation seven, equation eight and equation nine. The LCR is negatively and significantly related to NIM, which is consistent with the view that there is a significant negative relationship between NIT and funding liquidity risk (Charmier, 2018; Pradhan & Shrestha, 2016; Marozva, 2015). This could point to the fact that higher liquidity hurts bank performance. The overall finding is not in line with the theoretical predictions; however, it is in line with the results of other authors who have investigated the relationship between NIM and funding liquidity ratio. Basel III regulates that banks must maintain a minimum CAR in order to resolve liquidity requirements. These minimum requirements assist banks to recover as quickly as possible, should there be any financial crisis. Therefore, the banks under review appear not to have followed the Basel III Accord. The next section discusses the results found between Z-score and bank performance.

Table 5.9: Empirical results for Models 10 to 12 where Z-score is the profitability measure

	2 Step System GMM Equation 10	Fixed Effects Model	2 Step System GMM Equation 11	Fixed Effects Model	2 Step System GMM Equation 12	Fixed Effects Model
L.Z-SCORE	0.0937	0.209	0.162	0.386*	0.477	0.394*
	(0.115)	(0.0955)	(0.211)	(0.156)	(0.360)	(0.170)
CAR	121.5*	66.69***				
	(74.66)	(9.875)				
SIZE	6.849**	3.359**	7.364*	-2.015	5.666	-4.011
	(5.147)	(1.048)	(7.636)	(2.067)	(10.65)	(2.915)
NPL	5.473	-10.22*	212.6	-11.04**	665.8	-8.393**
	(145.8)	(27.88)	(285.6)	(30.87)	(1017.7)	(43.50)
INT	15.63	10.40	-74.82**	4.740	-145.3	23.07
	(49.83)	(17.98)	(83.78)	(39.92)	(82.22)	(42.25)
DUMMY	3.190*	0.617	3.646*	2.056*	8.793	1.924
	(4.620)	(1.115)	(8.197)	(0.708)	(13.20)	(1.065)
NSFR			-49.58	-18.37**		
			(40.80)	(4.149)		
LCR					-11.12*	-2.079**
					(17.74)	(0.734)
_cons	-56.04	-20.25*	-30.85	30.65	-18.36	43.81
	(43.70)	(8.921)	(52.54)	(15.23)	(67.12)	(22.09)
N	132	132	132	132	132	132
R^2		0.717		0.444		0.361

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: Author's computation

Table 5.10: Post estimation diagnostic statistics for the 2-step system GMM model results presented in Table 5.9

	2-Step System GMM	2-Step System GMM	2-Step System GMM
	Equation 10	**Equation 11**	**Equation 12**
Arellano-Bond AR(1)	-0.66	-0.76	-0.53
Prob>z	0.507	0.448	0.327
Arellano-Bond AR(2)	-0.74	-0.48	-0.98
Prob>z	0.460	0.628	0.327
Sargan test of overid	8.94	2.63	2.99
Prob>χ^2	0.177	0.853	0.810
Hansen test of overid	3.31	2.51	2.38
Prob>χ^2	0.768	0.867	0.882
Instruments	12	12	12

Source: Author's computation

The post-diagnostic statistics show that the models are robust and are not weakened by any instrument, as the number of instruments does not exceed the number of groups. Table 5.9 captures the results for the regression analysis between bank performance and Z-score as a measure of performance adjusted for risk and the independent variables. The analysis focuses on the two-step GMM results, as this was the most appropriate estimation technique; however, the fixed effects model results are presented for robustness. Equation 10's output represents the relationship between Z-score and bank performance, amongst other control variables. Table 5.9 shows the estimation results for equation 10, where there is a positive but not significant relationship between Z-score and the previous Z-score. The CAR is positive and significant, which is more or less consistent with the capital buffer theory. This confirms the results of Pradhan and Shrestha (2017) and Zheng *et al.* (2012), who also found a positive relationship between the two variables. According to Zheng *et al.* (2012), banks with adequate capital adjust their capital buffer and risk positively, as opposed to banks that maintain higher levels of capital.

It is important for banks to understand which overall risk factors have a greater impact on financial performance, and use better risk-adjusted performance measures to support their strategies.

For example, banks must establish a credit risk process from the initiation to the appraisal of loans, considering the sound credit risk management scenarios imposed by regulatory bodies. The banks also need to enhance their internal control measures to ensure the strict implementation of internal processes on lending.

Size is positive and significant, which is similar to the findings of Ariwati and Maksum (2018), who concluded that the greater the size the more the profitability. Larger banks tend to focus less on performance, and thus take higher risk. The dummy variable is significant in this case, and there is a significant difference between the banks that are compliant with Basel III and those that do not. This result is in line with Klomp and Haan (2015) and Alam (2013), who also found a difference between the banks that comply with regulations and those that do not. According to Nyoka (2017), complying with the banking regulations in terms of Basel III determines for how long a banking organisation will remain in business from a regulatory point of view. Klomp and Haan (2015) concluded that consistency in complying with strict regulations sustains banks, prevents bank failures and increases efficiency.

Equation 11 shows positive but not significant results with the previous Z-score, which confirms the findings of equation ten. The estimation results from equations ten and eleven revealed that size is positively and significantly related to the Z-score. This implies that as the bank's size increases, bank performance increases. This result confirms that larger banks focus on objectives other than profit-making, while profit-making is a priority for smaller banks because they want to grow. The dummy variable is significant, which confirms the results of equation 10. The estimation results in equations 10 and 11 revealed that risk measured by Z-score is significantly related to dummy, i.e. there is a significant difference between the performances of banks that comply and those that do not. Equation 12 shows a positive but not significant relationship with the previous lagged effects. This confirms the results of equations ten and eleven, where the LCR was negative and significant.

This result is in line with that of Chen et al. (2017) and Alshatti (2014), who concluded that liquidity risk lowers bank performance.

Banks with insufficient stable funding use liquid assets or rely on external financing to meet demand, which increases their cost of funding. Banks that possess a high level of illiquid assets in loans are likely to receive higher interest income. Liquidity risk is a threat to bank performance. These results suggest that applying capital requirements to LCR will require the banks under review to manage their assets appropriately, encourage their financial intermediation process, and introduce more innovative products. The dummy is positive and not significant, i.e. there is no difference between the banks that comply and those that do not.

5.3 SUMMARY CHAPTER

In this chapter, the descriptive statistics of the dependent variables and independent variables were discussed. The post-diagnostic statistics were presented, which showed that the models are robust and not weakened by any instrument as the number of instruments does not exceed the number of groups. The fixed-effect model was presented for robustness. The GMM two-step regression was conducted on the panel data as this was the most appropriate estimation technique. The discussion in this chapter revealed that the nexus between bank performance and bank regulatory requirements, although somewhat the same, differ depending on the measurement or variable of performance used. Some significant results included that CAR has a negative and statistically significant effect on bank performance, while NPL had a negative and statistically significant impact on bank performance. Some analysis of bank-specific data revealed that the behaviours of banks in terms of performance and risk-taking are influenced by their size as measured by total assets. Larger banks generally operate at low NIM and overall risk as measured by Z-scores compared to smaller banks. Conversely, smaller banks are moderate, both in terms of performance and risk-taking. They operate at a moderate NIM and overall risk takings compared to larger banks.

Additionally, during the period under review, the South African regulatory bodies were lenient about restricting banking activities and implementing reviews, but were strict on capital, regulatory requirements and market discipline. The next chapter focuses on the theoretical framework for the current study, the conclusion and recommendations.

CHAPTER 6: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter presents a summary of the study, draws conclusions and presents recommendations for future research. Furthermore, final remarks on the theories, empirical studies and findings relating to the nexus between bank performance and regulatory requirements in South African banks are explained. The findings are based on the tests reported on in Chapter 5. The research findings are discussed within the context of other empirical studies, and some important insights are drawn, including policy, theoretical and social implications. This chapter provides a conclusion as well as recommendations to key stakeholders, policymakers and regulators in the banking sector regarding how to leverage the results of the relationship between bank performance and regulatory requirements.

6.2 SUMMARY OF FINDINGS AND POLICY IMPLICATIONS

This study aimed to determine the impact of regulatory requirements on bank performance. The study was motivated by previous studies which were conducted by numerous scholars on the application of regulatory requirements in both South Africa and globally. Despite such efforts, banks are still failing globally, which remains an unresolved issue (Boora & Jongra, 2019; Taranhike, 2017). The study intended to fill the gap in knowledge by analysing the impact of regulatory requirements on bank performance in South Africa. Whilst the study objectives were outlined as follows:

- To examine the relationship between bank performance and capital adequacy.
- To investigate the relationship between bank performance and liquidity coverage ratio.
- To examine the relationship between bank performance and net stable funding ratio.
- To examine the relationship between bank performance and bank-specific variables and macroeconomic factors.

The summary findings for this study were as follows. The regression analysis was inconsistent, as the capital adequacy ratio have both positive and negative significant effect on bank performance. There is negative and significant constant relationship between bank permeance and liquidity coverage ratio. The results also showed a negative significant relationship between bank performance and net stable funding ratio, which supports the financial fragility theory. Furthermore, the results under bank specific variables showed the following; the size showed both negative and positive significant relationship with the bank performance. Lastly, non-performing loans and interest showed a negative significant relationship on bank performance. The next section discusses the results in detail.

6.2.1 Findings on CAR and policy implications

The results from the regression presented the following. There was a negative significant relationship between CAR and ROE. The relationship between CAR and ROA showed positive and significant. The results further showed a negative significant relationship between CAR and NIM which is in contrast with the study expectations. The researcher expected a positive relationship since majority of the banks under review maintain higher levels of capital. The relationship between CAR and ZSCORE was positive and significant which is more or less consistent with the capital buffer theory.

The GMM showed both positive and significant relationship with the bank performance.

The negative and significant relationship between CAR and bank performance results were in line with those of Taranhike (2017), Soile-Bologum (2017) and Yusuf and Eundayo (2018). These results show that banks with higher capital are associated with a lower return on equities, and banks with lower capital are associated with higher returns on equities. These means that banks with higher capital have a lower performance relative to lower capital. Banks with lower CAR tend to take more risks, and as a result, they tend to perform better.

Allen, Carletti and Marquez (2011) argued that banks that hold capital above minimum regulatory requirements are not necessarily prevented from the negative effects of financial crises. The buffer capital adequacy theory is relevant to the study because it does not support holding CAR above the minimum requirement. The holding of higher capital will lead to banks taking excessive risk-taking by focusing less on profit-making, which may lead to penalties if there are any non-compliance issues. Moreover, holding more capital does not support the operations of the bank to improve bank performance. The negative relationship suggests that banks create more loans when having capital above the requirement, leading to more non-performing loans. This study implies that regulators must discourage banks from reckless lending to customers and impose sanctions for non-adherence to the minimum CAR.

However, when performance was measured by CAR, the estimation results showed a positive and significant relationship. This confirms the results of Kana (2017), Majumder and Li (2017), Nyoka (2017), Okoye *et al.* (2017), Ofoeda *et al.* (2016), Rachdi and Ben Bouhen (2016) and Almazari (2013). These results show that banks with higher capital are associated with a lower return on equities, and banks with lower capital are associated with higher returns on equities. This simply means that banks with higher capital have lower performance relative to lower capital, and banks with lower CAR tend to take less risk. As a result, the latter tend to perform better. The positive relationship implies that the higher the CAR, the higher the banks' capacity to absorb risk, therefore banks need to create higher levels of CAR by accepting deposits and issuing loans to maintain profitability (Luvuno, 2018; Vodavo, 2011). This study implies that the SARB should consider increasing the level of capital held by banks in South Africa by introducing the transfer of an increased percentage of profit to the capital to strengthen the banks' credit loss absorption capacity further. The study thus found contradictory results, but both are significant.

The results imply that the adoption of the Basel III Accord can assist banks in South Africa by reducing equity pressure to make more profits, and reduce give out bad loans or make bad credit decisions, which in turn leads to NPL. Complying with the minimum capital requirements would be ideal as a buffer against risk.

6.2.2 Findings on NSFR and LCR and policy implications

Lastly, the study conducted a regression analysis to test the relationship between liquidity as measured by NSFR, LCR and bank performance. The results showed a negative and significant relationship between NSFR and bank performance, which supports the financial fragility theory. This theory crowds out the bank deposit ratio, which suggests a negative relationship between bank capital and bank liquidity. The results are in line with Berger and Bouwman (2017), who found that a CAR that is above minimum lowers the deposit ratio, as higher capital crowds out deposits and lowers liquidity. Diamond (2006) also indicated that limited capital, highly fragile banks tend to hold higher liquidity buffers than more stable and less vulnerable banks.

On the other hand, the GMM estimation results analysis showed a constant negative relationship and significant results between LCR and bank performance. This consistent with the view that there is a significant negative relationship between LCR and bank performance (Charmier, 2018; Pradhan & Shrestha, 2016; Marozva, 2015). This shows that higher liquidity hurts bank performance, but the overall finding is not in line with the theoretical predictions. It is, however, in line with the results of other authors who have investigated the relationship between LCR and bank performance, as listed above. Basel III was issued with the regulation that banks need to maintain a minimum CAR to resolve any liquidity requirements. The policy implication is that banks under review must comply with the minimum standards to recover as quickly as possible, should there be any financial crisis.

6.2.3 Bank specific and macroeconomic factors affecting performance

The secondary variables for the study such as size, non-performing loans, interest rates, and dummy are discussed below in detail.

6.3.1 Findings on size and policy implications

The study also investigated the relationship between the size of a bank and its performance. The results from the regression analysis were inconsistent as the GMM for size showed negative and significant, as well as positive and significant. The results that showed a negative and significant relationship were in line with those of Ariwati and Maksum (2018), Taranhike (2017), Bukair and Rahman (2015), Mashonganyika (2015), Dawar (2014) and Jara-Bertin (2014), who emphasised that the bigger the bank, the worse it performs. This implies that when banks become too big, they tend to focus on objectives other than profit-making, yet for smaller banks, profit-making is a priority because they still want to grow.

The estimation results showed a positive and significant relationship between CAR and size. These findings were consistent with those of Ali and Paul (2019), Rassid (2017), Singh and Sharma (2016), Terreza (2015), Jara-Bertin, Moya and Parales (2014) and Westhuizen and Oberholzer (2003). These scholars agreed that larger banks tend to focus more on other objectives, unlike smaller banks that focus more on profitability. An increase in bank size is thus associated with poor performance.

The study thus found two contradictory sets of results that were all significant. The study implies that the South African banking sector should keep the size of the banks as small as possible because larger banks tend to focus more on growing than profit-making, whereas smaller banks focus more on profit-making and take more moderate risks.

6.3.2 Findings on NPL and policy implications

The estimation results analysis conducted on NPL and bank performance showed negative and significant results. This is in line with studies conducted by Luvuno (2018), Charmier *et al.* (2018), Chen *et al.* (2017), Le (2017) and Dhar and Bakshi (2015).

Le, and Dhar and Bakshi asserted that the higher the NPL, the lower the banks' ability to offer credit to customers, which results in a liquidity crunch that in turn, impacts performance. This eventually leads to investors and depositors withdrawing their funds, pushing the bank into a mismatch which will also affect their returns.

The result thus implies that banks should bolster their credit underwriting policies to ensure good quality loans are brought onto their books. In addition, banks in South Africa should implement rigorous collection strategies to ensure that their collection of debts is efficient. Lastly, banks must make a provision against NPL to ensure stability in the banking sector, which will reduce the number of NPLs and improve performance.

6.3.2 Findings on INTR and policy implications

This study examined the relationship between INTR (repo rate) and bank performance, and found a negative and significant relationship. The GMM results were consistent and implied that the higher the INTR, the lower the bank performance. However, these results were not in line with Charmier *et al.* (2018), Kana (2017), Marandu and Sibindi (2016) and Ngure (2014), who found a positive relationship between INTR and bank performance. Hanweck and Ryu (2005) also insist that fluctuations in interest rates have a significant positive relationship with bank performance. Their justification was that interest rates are strictly related to returns on a bank's liabilities, which quickly adjust to changes in interest rates in the financial market. The results of this study confirm that an increase in INTR negatively affects performance.

The results of this study are in line with the theory of Schumpeter (1939), who suggested that recessions and periods of economic growth are the reason for exogenous changes in the real economic environment. As a result, this leads to declines in profitability, a fall in asset prices, NPL, a lowering of borrowers' financial capacity, a fall in employment levels, and a depressed value of collateral as a secondary means of servicing debts. The bank's risk-taking increases and consequently raises the need for more substantial loan provisions and higher levels of capital, exactly when it is more excessive or not available. These may put a bank under pressure by reducing their amount of lending, especially if they have low capital buffers above the minimum capital requirements.

Therefore, the effects of the economic downturn as well as increasing the lending rates critics the theory by stating that it is a common misconception that macroeconomic purely based on shocks to supply as opposed to shocks on demand.

This leads to the common criticism of Schumpeter of economic cycle theory by ignoring the demand side of the economy. Ngure (2014) criticised this theory because it only considers the supply of loans by banks to customers and ignores the demands of the economy, for example, the fluctuations of interest rates. These results imply that the SARB should consider increasing the capital buffer requirements during times of economic boom to ensure that banks have adequate capital during an economic recession, as liquidity crises affect bank performance. Another policy implication is that banks need to consider the movement of interest rates to ensure that any changes in the economy driven by macroeconomic factors (GDP and inflation) are factored in so that they do not affect bank performance.

6.2.5 Findings on DUMMY and policy implications

When performance was measured by CAR, and Z-score measured overall risk, the dummy variable was found to be significant. These results mean that there is a difference in performance between the banks that are compliant and those that are not compliant with Basel III capital adequacy ratio.

These results are similar to those of Ofoeda (2016), Klomp and De Haan (2015) and Alan (2013), who concluded that consistency in complying with strict regulations sustains the bank, prevents bank failures and increases efficiency, and again, that there is a difference between the banks that comply and those that do not. Nyoka (2017) noted that complying with Basel III determines for how long a banking organisation will remain in business from a regulatory point of view. Klomp and De Haan (2015) concluded that consistency in complying with strict regulations will sustain a bank, prevent failures and increase efficiency. The policy implication is that banks must be consistent in complying with the regulatory requirements to ensure good performance.

6.3 LIMITATIONS OF THE STUDY

The following can be seen as limitations of the study:

1. Limited studies have focused on the impact of bank performance on regulatory requirements in South Africa, which resulted in this study using theoretical and empirical studies from other countries as a point of reference.
2. The study focused on 12 registered banks in terms of Bank Act 94 in South Africa for the period 2009 to 2019. The study excluded a number of smaller banks in terms of assets, and because of the unavailability of financial statements. Had they been included, the analysis would have provided another paradigm in terms of bank size and performance. The results of smaller banks' responses to the global financial crisis would have been of great value; however, the exclusion was based on the lack of incomplete data for the period under review.
3. Lastly, the study focused on the period 2009 to 2019, which partially covered the period of the global financial crisis. To further understand bank performance dynamics and regulatory requirements dynamic, and management responses during the crisis period, a recommendation for future studies would be to cover the periods before, during and after a financial crisis.

6.4 RECOMMENDATIONS TO BANKS

The banks under investigation must improve their credit risk assessment framework to be more prudent in their lending practices, as this will enhance the lending quality of their loan books and thus their performance. To keep their capital levels at a minimum to avoid excessive risk-taking, the banks must grow their capital levels by embarking on efficient revenue enhancement activities such as increasing retained earnings. This can be done by looking at their clients on an overall basis, not only on a transactional basis, as this will improve non-interest revenue income by introducing innovated products.

Lastly, banks must lower their liquidity risk exposure by collectively managing their capital adequacy ratio, size of the bank, interest rates, non-performing loans, liquidity coverage ratio and net stable funding ratio.

The SARB should consider increasing regulatory capital requirements and ensuring that the banking sector and merging smaller banks are compliant with the Basel III capital adequacy ratio.

The SARB must improve its supervision and oversight functions by enforcing prudential regulations, ensuring adherence to lending practices, and fostering healthy and adequately capitalised balance sheets. Lastly, the SARB must align its macroeconomic forecast for INTR (lending rates) with regulatory requirements to ensure that economic performance is a catalyst for bank performance.

The banks under review need to enhance their deposit-taking ability to tighten their loan underwriting criteria and credit offering policies, and should create rigorous and proactive collection strategies. The regulatory bodies should consider monitoring the minimum required ratio of CAR more closely to avoid excessive risk-taking, as banks with an excess of capital tend to take more risks.

Lastly, during an economic crisis, the SARB must explore ways to factor in economic changes driven by INTR in order to reflect a change in bank performance.

6.5 SUGGESTIONS FOR FUTURE STUDIES

The study was limited to South African registered banks in terms of the Banks Act 94 of 1990, whose data information for the period 2009 to 2019 was available and accessible. A number of small banks whose financial information was not available for the duration of the study were thus excluded from the study. The consequence of excluding these smaller banks was that crucial information regarding bank size and performance was not assessed. Furthermore, this study only considered banks that were registered in terms of the South African Banks Act 94 of 1990, for example, it excluded mutual banks. Research which incorporates both registered and non-registered banks should be pursued in order to understand the impacts of registered and non-registered banks in South Africa.

Secondly, a study could be undertaken which incorporates both locally registered banks and international banks, in order to understand the differences between the two groups.

The period of this study covered the global financial crisis in the 2007 to 2009 period. A further recommendation is for a study to be conducted that differentiates further by examining before, during and after the global financial crisis.

Lastly, the current study discovered that only internal bank-specific variables impact bank performance, thus a recommendation is to research whether bank performance is affected by internal or external (inflation and GDP) variables, or both.

6.6 SUMMARY CHAPTER

The study investigated the relationship between bank performance and regulatory requirements in South African Banks that are registered in terms of the Banks Act 94 of 1990. The panel data was used for the sample of twelve banks in South Africa from 2009 to 2019. Data was presented using descriptive statistics, multicollinearity, heteroscedasticity and autocorrelation were conducted on the data as part of the diagnostics.

Correlation and regression analysis for four performance measurement, for example, ROE, ROA, NIM and ZSCORE were conducted. The Hausman test was also conducted to determine which model was preferred between fixed effects and random effects. A regression analysis was conducted on four bank performance ratios using pooled ordinary least square regression. However, the two-step GMM was preferred over the other methods due to the endogeneity problem that existed among the banks at the time of this study. The bank-specific variables were, CAR, SIZE, NPL, INTR, LCR, and NSFR, the macroeconomic dependent was GDGP and UMPL, were chosen and analysed. The following results can be confirmed; capital adequacy and size have both a positive and negative significant effect on bank performance, while interest rates, non-performing loans, liquidity coverage ratios and net stable funding ratios had a negative and significant effect on bank performance. The study recommends further study on the subject matter through examining pre and post global financial crisis data.

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